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FIELD MANUAL
No. 1-103

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 30 December 1981

AIRSPACE MANAGEMENT AND ARMY AIR TRAFFIC IN A COMBAT ZONE

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*This manual supersedes FM 1-60, 30 September 1977.

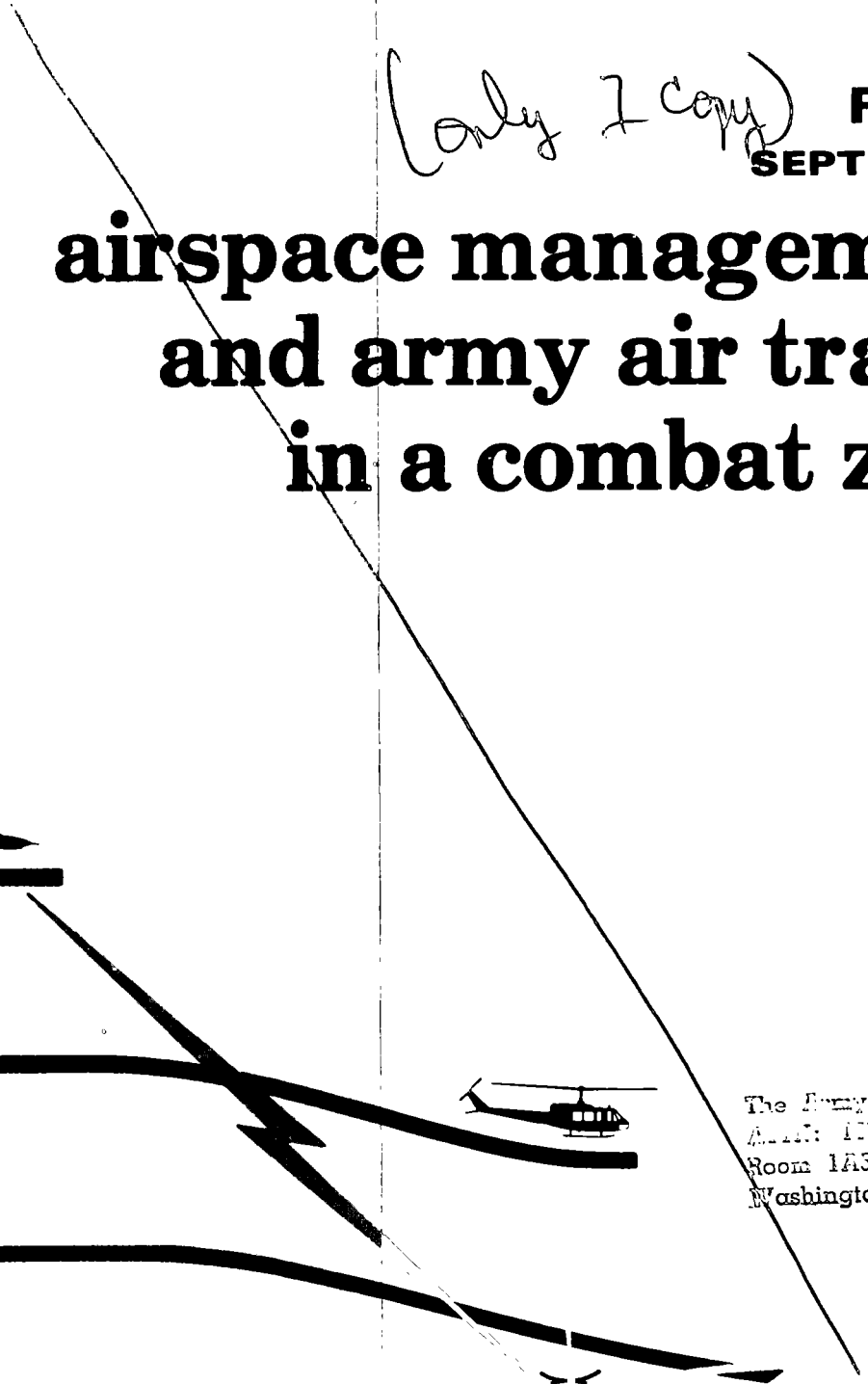
FM 1-60
Reference

S/S FM 1-103
30 Dec 1981

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FM 1-60
SEPTEMBER 1977

airspace management and army air traffic in a combat zone



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Statement

The word "he" is intended to include both the masculine and the feminine genders. Any exceptions to this will be as noted.

Field Manual }
No. 1-60 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 30 September 1977

airspace management and army air traffic in a combat zone

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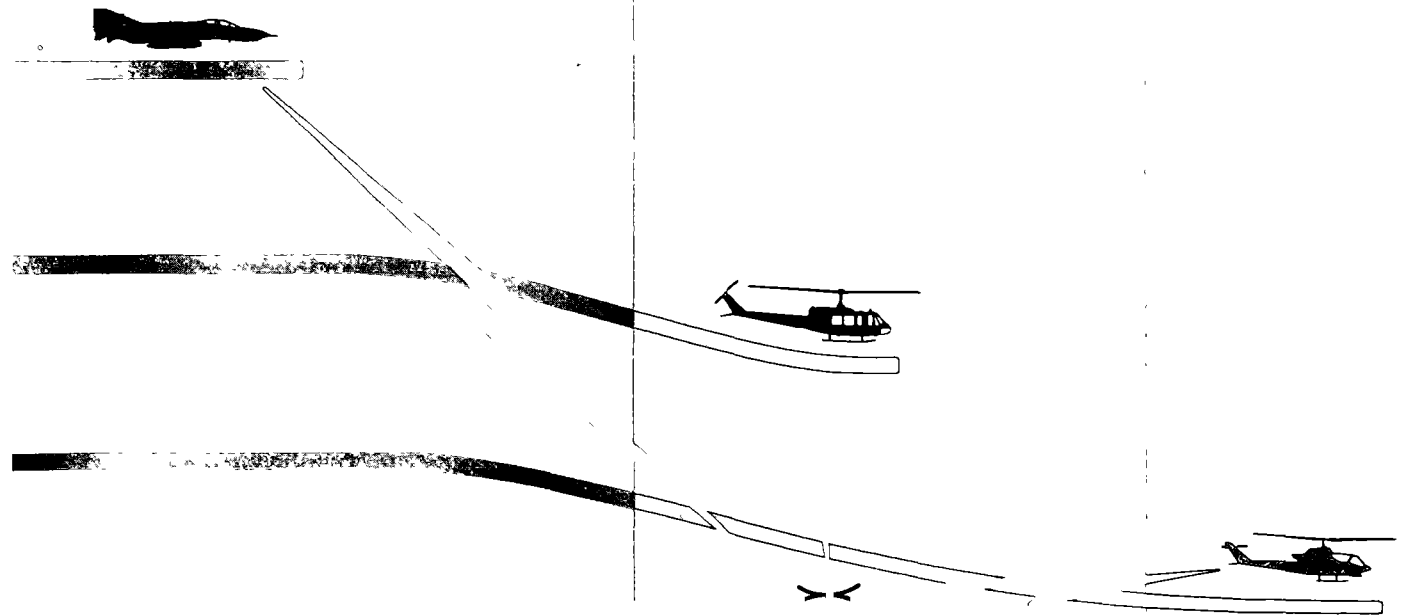
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introduction



purpose

Wartime operations require maximum emphasis on accomplishment of the mission, and airspace management procedures must not detract from our combat power. This is especially true in the division portion of the combat zone where helicopter operations are characterized by their capability to take off and land almost anywhere, and to operate under almost any condition, anytime. How well such Army aviation operations are conducted depends on pilot skill and commonsense. These inherent capabilities are not to be degraded by the establishment of needlessly restrictive procedures or controls. The procedures described in this manual are intended to enhance and assist in accomplishing Army aviation combat operations.

This manual has been written with the basic premise that special relationships must exist between US Army and US Air Force tactical forces.

FM 1-60 is in consonance with doctrine contained within FM 100-42, *US Air Force/US Army Airspace Management in an Area of Operations* and supersedes FM 100-44(T), *Army Procedures for Airspace Management in a Combat Zone*. All commanders must recognize that all Service components need to use the airspace over the combat zone in the performance of their assigned missions and that airspace procedures must contribute to and not detract from the overall objective—EFFECTIVE COMBAT EMPLOYMENT OF THE JOINT FORCE.

The purpose of this manual is to provide information and guidance on the operational functions and procedures for airspace management and Army air traffic control in an area of operations. It provides the basic fundamentals to optimize Army aviation unit operations—around-the-clock—in an airspace shared by a variety of friendly forces. Guidance is provided for maneuver force commanders, Army aviation unit commanders, air traffic control units, and individual pilots.

Commanders are reminded that during peacetime operations they may be expected to apply environmentally dictated safety measures to their training. These precautions should be applied in a manner that continues to afford realistic training and insure mission accomplishment.

scope

This manual is primarily concerned with Army procedures necessary to exploit the mobility and effectiveness of Army aviation units in support of normal frontline operations by land combat forces.

Specifically, it provides Army doctrine and procedures for airspace management and air traffic control in a high threat environment. Doctrine expressed has been developed in consonance with the needs of all other friendly airspace users. Readers are to keep in mind that the objective of airspace management is to maximize joint combat effectiveness—in part—by capitalizing on the unique capabilities of Army aviation units. Procedures outlined are not intended to constrain these units' flexibility. If anything, they are simply commonsense measures that will ultimately enhance combat effectiveness and put maximum pressure on the enemy.

This manual extends the policies, procedures, and doctrine provided in FM 100-42. Appendix A contains a thumbnail sketch of related publications.

In addition, this manual has been written in consonance with the following international standardization agreements:

STANAG 3465, "Safety, Emergency, and Signaling Procedures for Tactical Aircraft Operations"; STANAG 3631, "Wartime Air Priority System for NATO Countries"; NATO/CENTO 2134, "Offensive Air Operations"; STANAG 3627, "Tactical Helicopter Day and Night Formation Flying"; and STANAG 3805 (DRAFT), "Doctrine and Procedures for Airspace Control in the Combat Zone."

Standard definitions and abbreviations are contained in Army Regulations (AR) 310-25 and 310-50, respectively. Abbreviations and terms used in this manual which are not listed in the above-referenced ARs are explained in the text.

Recommended Changes

Users of this publication are encouraged to submit recommended changes and comments to improve the publication. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons as well as substitute statement(s) or paragraph(s) should be provided for each comment to insure understanding and complete evaluation. Comments should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) in accordance with AR 310-1 and forwarded directly to Commander, United States Army Aviation Center and Fort Rucker, ATTN: ATZQ-TD-TLDS, Fort Rucker, Alabama 36362.



concepts, responsibilities, and organization



concepts

The airspace over the combat zone is subject to use by all friendly forces participating in an operation. As a fundamental consideration, the primary objective of airspace management and air traffic control is to promote the safe, orderly, and expeditious use of airspace in the combat zone while contributing to maximum combat effectiveness and survivability. Efficient airspace management and air traffic control should permit combat operations without adding undue restrictions and with minimal adverse impact on the capabilities of any component.

Airspace management consists of the *coordination*, *integration*, and *regulation* of the use of airspace of defined dimensions. In this context, coordination is that degree of authority necessary to achieve effective, efficient, and flexible use of airspace. Integration considers the necessity to consolidate requirements for the use of this airspace in the interest of achieving a common objective at the lowest possible level. Regulation indicates the requirement to supervise activities in this airspace to provide for flight safety and connotes the authority required to insure such safety.

Airspace control is a service provided within the combat zone to contribute to the maximization of combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to permit flexibility of actions in controlled airspace. Authority to approve, disapprove, or deny combat operations is vested only in the joint force commander.

**AIRSPACE
MANAGEMENT**

+

**AIR TRAFFIC
CONTROL**

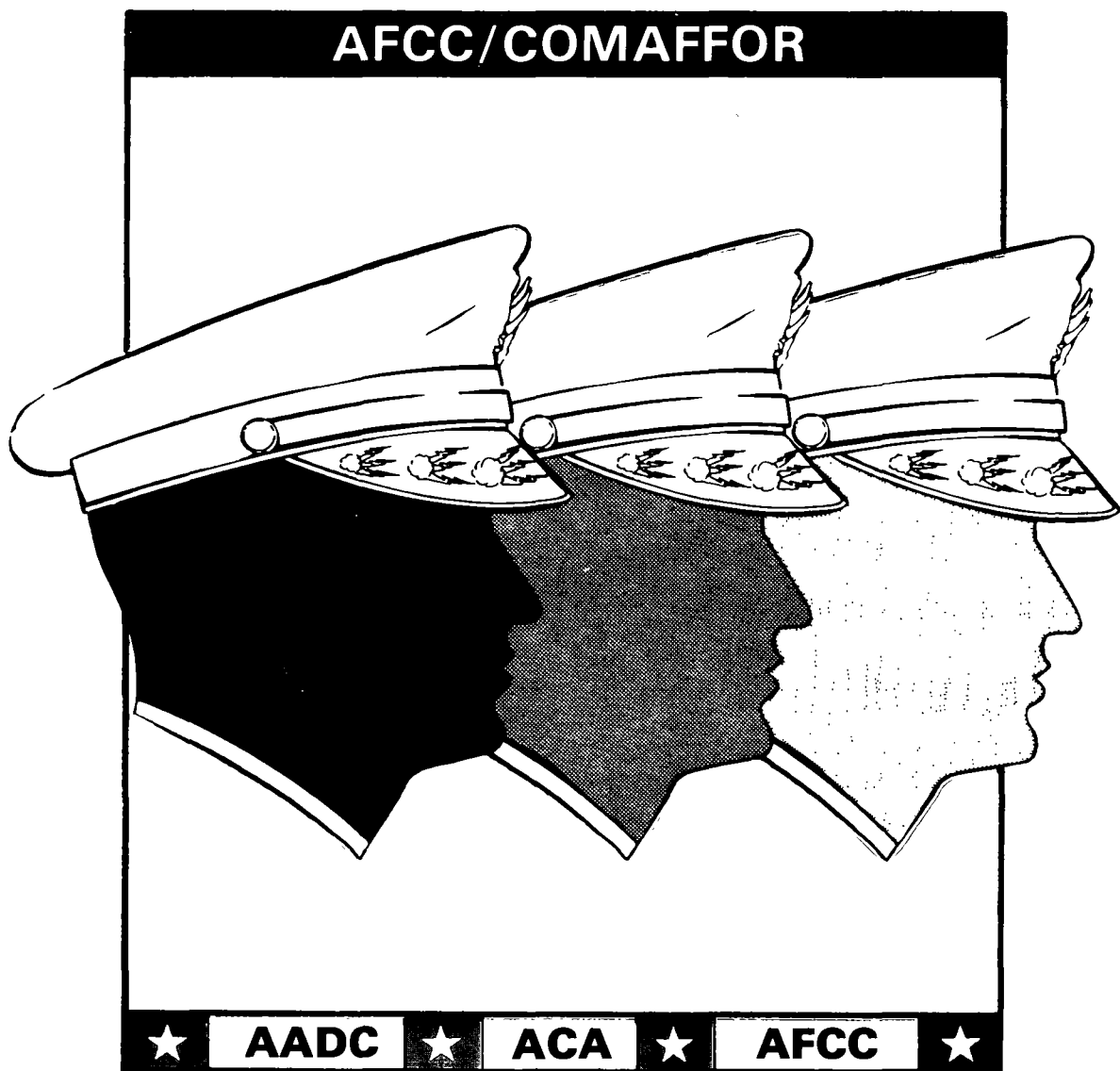
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**SAFE, ORDERLY
USE OF
AIRSPACE**

responsibilities

THEATER OPERATIONS

In joint Army-Air Force operations, the Air Force Component Commander/Commander, Air Force Forces (AFCC/COMAFFOR) will be designated the area air defense commander (AADC) and the airspace control authority (ACA) with the responsibility for operation of the area airspace management system (AAMS) as directed by the US-unified or joint task force commander's objectives.



COMBAT ZONE



The commander, US Army combat forces (normally corps), is responsible for airspace management functions within his area of territorial responsibility, as defined by the ACA. Subject to the operational command/control of the joint force commander, each component commander within the joint force has responsibility for the following:

Tactical employment and internal administration of his own forces.	Employment of air defense weapons systems in accordance with the policies and procedures promulgated by the area air defense commander.
Coordinating the operations of his forces, aircraft, and weapons with other Service components, as required.	Providing airspace control and performing airspace management functions in any area that may be assigned by the airspace control authority.



In addition to the above, the Air Force Component Commander/Commander, Air Force Forces, acting as the airspace control authority and area air defense commander is responsible for:

Air defense procedures and rules of engagement.	Promulgating identification, friend or foe (radar) (IFF) procedures.
The overall planning and operation of the airspace control system within the airspace control area.	Developing the area airspace control plan and promulgating airspace management procedures.

The area airspace control plan and airspace management procedures include:

- Airspace control boundaries.
- Inflight reporting.
- Control of all air traffic operating under instrument flight rules/instrument meteorological conditions.
- Coordination procedures for aircraft operating under visual flight rules/visual meteorological conditions.
- Procedures for integrating air operation information produced by component command and control system into the airspace control system.
- Establishment of an airway structure and arrival, departure, enroute, and handover procedures when required for air traffic control.
- Establishment of airspace control sectors, airspace restrictions, and high density airspace control zones when required.
- Standardized formats for the exchange of airspace control information and coordination of airspace management activities (e.g., airspace restrictions, minimum risk routes, and coordinating altitudes).

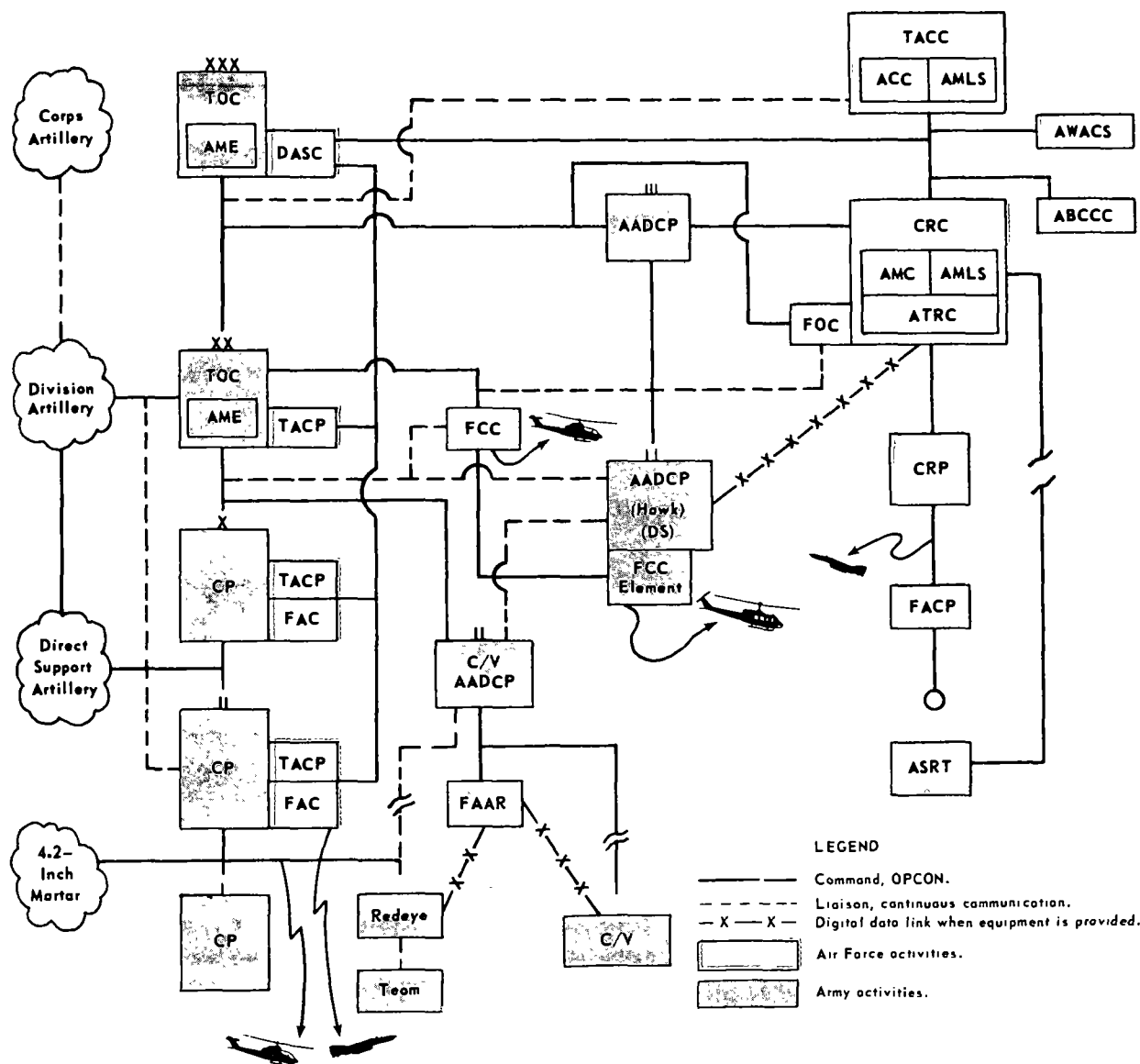
3

The maneuver unit (normally division, brigade, battalion) commander is responsible for coordinating his airspace activities when those activities may impact upon other airspace users. In the vicinity of the line-of-contact (LC) or forward edge of the battle area (FEBA), the maneuver battalion commander is responsible for detailed coordination of those airspace users directly participating in his operations. The support provided in response to his requests must be coordinated in its application, both to maximize its effectiveness and to preclude mutual interference. Although there is *normally* no requirement for a special staff element at the maneuver brigade or battalion dedicated to airspace management, the commander routinely exercises control and coordination through his staff, supporting liaison/fire support representatives, and subordinate unit commanders.

Responsibility for compliance with the rules of flight, rules of engagement, and firing restrictions lies with all commanders/leaders and individuals in control of equipment or systems to which such rules or restrictions apply.

organization—general

Simply stated, the airspace manager will be the maneuver commander. His staff will keep him apprised of the battle situation and will also provide the interface with other friendly airspace users. Not meant to confuse you or to overcomplicate the interface issue is the diagram below.



NOTE: Organizational structure shown represents Army-Air Force relationships with one corps deployed. Modification will be required for multi-corps operations.

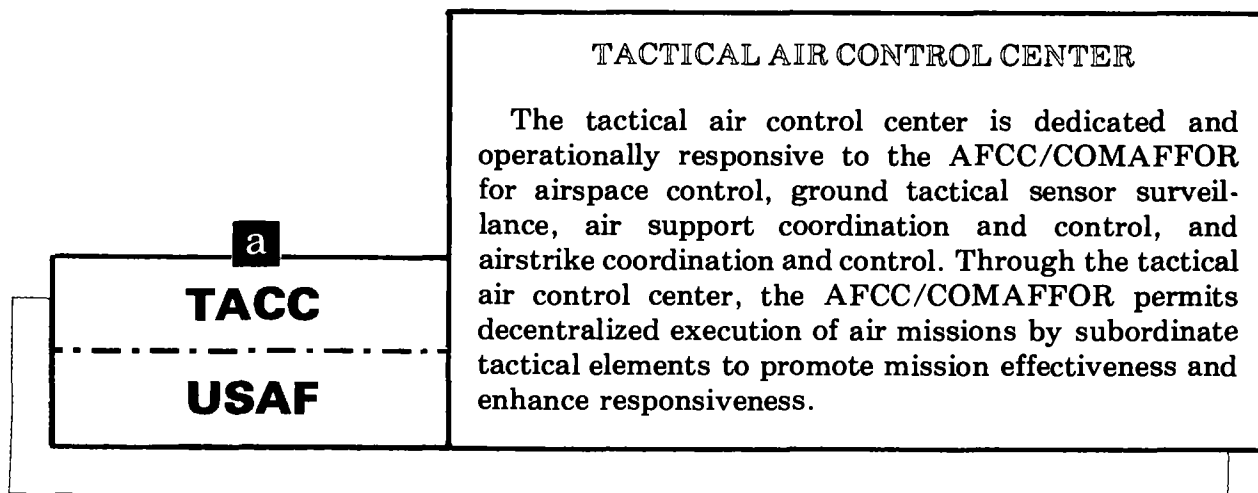
Airspace control system organization and communications structure.

As you can see from the diagram on the preceding page, interface is not something a commander or individual aviator can ignore. Airspace over the combat zone is going to be crowded, and coordination is a necessity. But is it all that complicated to accomplish? No! In most cases one radio call will set the system into motion. After that, it is a question of mission briefings to the individuals concerned, covering *who's going where, doing what, and when*. Deviation from the mission or operations order, as a matter of sound tactical procedure, is simply reported and redisseminated to the parties concerned by a predetermined means.

airspace control system facilities

Perhaps the easiest way to describe the airspace control system organization and communication structure is to elaborate on the diagram on page 9.

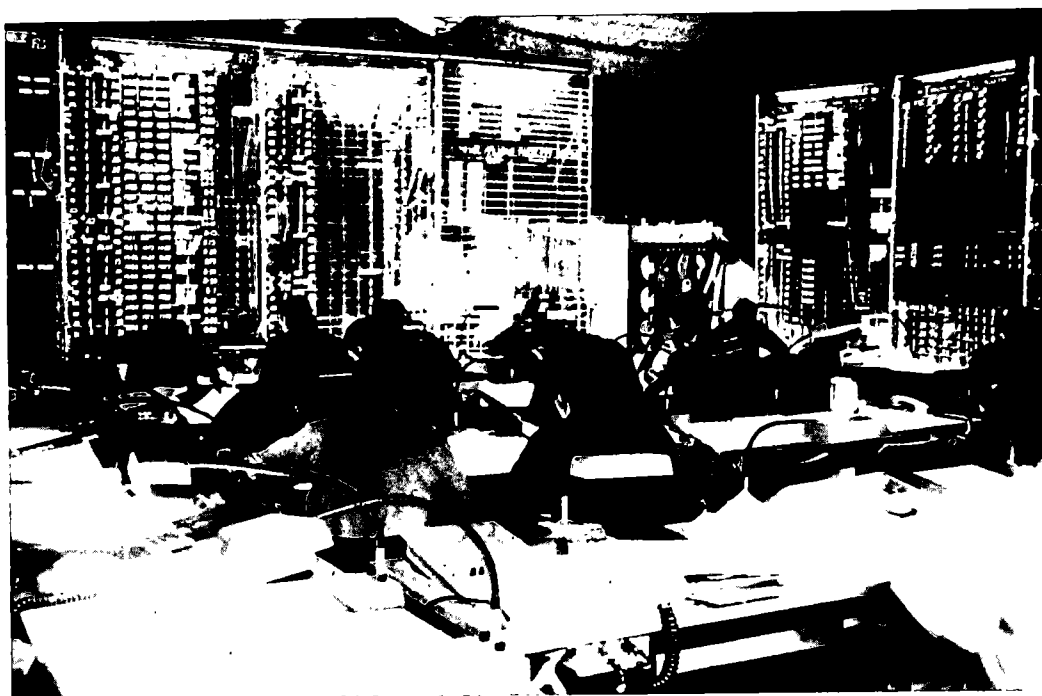
Some of the facilities available are Air Force and some are Army, but they are all there to support the joint effort. Certainly, it is not imperative to be extremely knowledgeable of all these organizations but these brief descriptions in paragraphs "a" through "r" below may give you additional sources of information not available at your level.





TACC's transportable operations central (TSQ-92).

Inside view of typical TACC in action.



b

AIRSPACE CONTROL CENTER

The airspace control center is the element within the tactical air control center through which the ACA coordinates and integrates the use of airspace in a combat zone.

c

AIRBORNE WARNING AND CONTROL SYSTEM

The AWACS is an airborne radar platform capable of providing all-altitude surveillance, warning, and aircraft control. AWACS operation will vary depending on the nature of the threat and the tactical missions being conducted. In locations where a ground tactical air control system (TACS) is present, AWACS will augment and/or extend the range of the control and reporting center. In the absence of ground TACS elements, the AWACS can operate autonomously to provide radar surveillance and airspace control in a combat zone as directed by the AFCC/COMAFFOR.

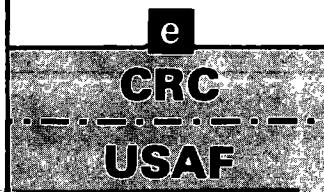
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AIRSPACE MANAGEMENT LIAISON SECTION

The airspace management liaison section located at the tactical air control center and the control and reporting center (CRC) provide the ACA an agency for planning, coordinating, and integrating activities related to airspace management. The AMLS is staffed with representatives from all of the Service components involved. Army representation to the AMLS at the TACC normally will be provided by the senior Army commander. Army representatives to the AMLS at the CRC normally will be provided by the appropriate corps commander from aviation and air defense assets. The Army air defense requirement is met by the air defense artillery liaison team currently provided to the control and reporting center. Personnel selected to staff the AMLS must be intimately familiar with the airspace users' systems and requirements.

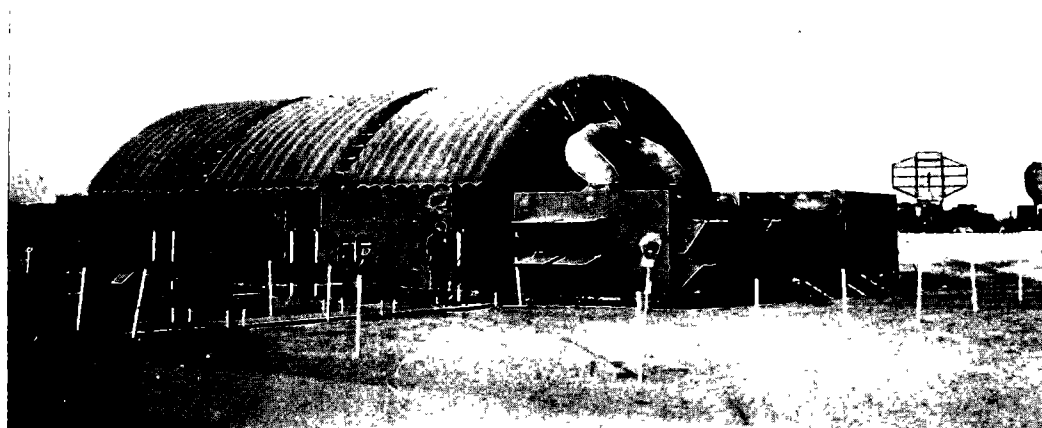
CONTROL AND REPORTING CENTER

The CRC is an element of the tactical air control system. It conducts radar control and warning operations within its area of responsibility. The CRC supervises the activities of subordinate radar units and collects, displays, evaluates, and disseminates information on air activities throughout the system. The CRC provides defensive and offensive mission control, navigational and air rescue assistance for friendly aircraft, and threat warning for friendly forces. The CRC provides the means for air traffic regulation and identification and is the primary airspace management agency in the airspace control area/sector.



CRC deployed in field location.

CRC's hardwall shelter, TSQ-91, with inflatable ceiling.



AIRSPACE MANAGEMENT CENTER

The airspace management center, which includes an AMLS, is an element within the CRC. It functions in response to airspace/air traffic requirements as an integral part of the area airspace control system. It is established to control, coordinate, regulate, and identify air traffic operating in an assigned airspace control area/sector. The airspace management center provides continuous cross-coordination, regulation, and integration of the component Services' air operations in accordance with the coordinated rules and procedures established by the airspace control center.

f

AMC

USAF

CONTROL AND REPORTING POST

The control and reporting post augments the CRC by extending radar surveillance and control capabilities. A CRP may assume the primary functions of a CRC (including the airspace management center and AMLS functions) within its capabilities. The CRP functions as an airspace control facility in an airspace control sector.

g

CRP

USAF

*CRP employs
the same
TSQ-91
operations
central as the
CRC.*



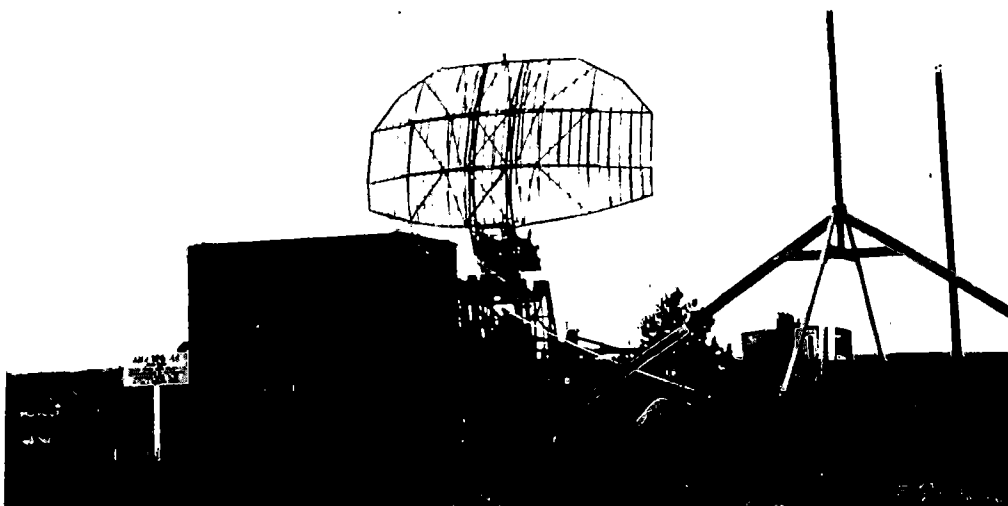
FORWARD AIR CONTROL POST

The forward air control post is a subordinate facility of the CRC or CRP and consists of lightweight surveillance and control radar to extend system coverage, fill gaps, and provide limited extension of control capability. The forward air control post functions as an airspace control facility in an airspace control sector.

h

FACP

USAF



*FACP with
AN/TPS-44
radar erected.*



*FACP van is a
mobile airspace
control facility
employed with
CRC or CRP.*

i
ABCCC

USAF

AIRBORNE BATTLEFIELD COMMAND AND CONTROL CENTER

The ABCCC is an airborne command and control element manned by a battlestaff commander, aircraft and weapons controllers, and operations, intelligence, and communications specialists. The ABCCC provides the capability for control of tactical air operations in forward battle areas, sometimes beyond the range of ground-based TACS elements. Its primary function is to serve as a direct extension of the TACC current operations division, but it can provide limited nonradar control of aircraft proceeding to and from designated target areas in the combat zone.

*ABCCC personnel
inside EC-130E
aircraft, coordinating
an operation.*



j
ASRT

USAF

AIR SUPPORT RADAR TEAM

The ASRT is a mobile unit equipped with precision radar to provide all-weather guidance for tactical strike aircraft against ground targets. It may also be used to position reconnaissance and tactical airlift aircraft over predetermined coordinates.

FLIGHT OPERATIONS CENTER

The FOC is a corps-level, enroute air traffic control facility. It is collocated with or electronically connected to the CRC. When the FOC is physically separated from the CRC, the Air Force will furnish communications for connecting the two facilities. The FOC serves as the primary air traffic control facility for control of Army air traffic in the rear operations area.

k

FOC

USA

FOC is the primary air traffic control facility for Army aircraft in the rear operations area.



ARMY AIR DEFENSE COMMAND POSTS

1
AADCP

USA

Army air defense artillery operations are controlled by Army Air Defense Command Posts. The AADCPs controlling the Hawk and Nike Hercules weapon systems are supported by radars and semiautomatic command and control systems. The division air defense artillery battalion and nondivisional Chaparral/Vulcan battalion AADCPs are manual and feature full decentralization of engagement authority for the Chaparral/Vulcan air defense artillery weapons. Control authority for Redeye and organic non-air defense weapons capable of engaging aircraft rests with the using unit, subject to compliance with rules and procedures established by the area air defense commander.

FLIGHT COORDINATION CENTER

m
FCC

USA

FCCs are enroute air traffic control facilities employed in the corps rear area and division area. When employed in the corps rear area, the FCC provides an extension of communications for the corps FOC. The FCC in the corps rear area designated as the alternate FOC will be collocated with or electronically connected to an Air Force facility (CRP or FACP) to insure continuity of the flow of information required for air defense and air traffic management operations. When employed in the division area, the FCC provides a communications link between the terminal facilities of the division airfields, other airfields located nearby, division tactical operations centers, other FCCs, and the corps FOC.

DIRECT AIR SUPPORT CENTER

n
DASC

USAF

The direct air support center is a mobile, air-transportable facility designed to operate with a corps tactical operations center or an independent division tactical operations center. The primary task of the direct air support center is to provide a fast-reaction capability to satisfy immediate requests from Army forces for tactical air support.



The DASC is not only highly mobile, but air-transportable as well.

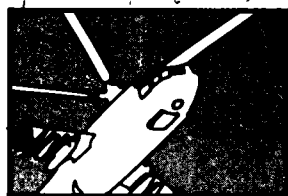
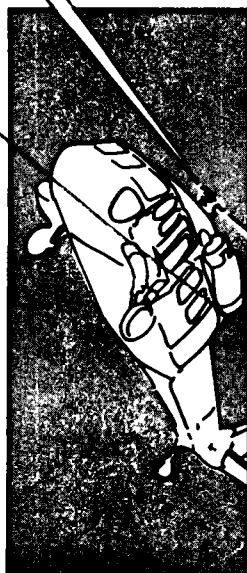
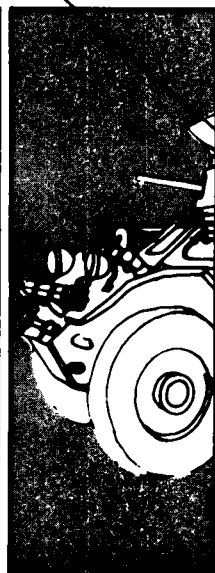


The DASC uses the TSQ-93 transportable hardwall operations central.

FM 1-88 copy 2 SIC by FM 1-402, August 1984
95 July 1980
JULY 1980
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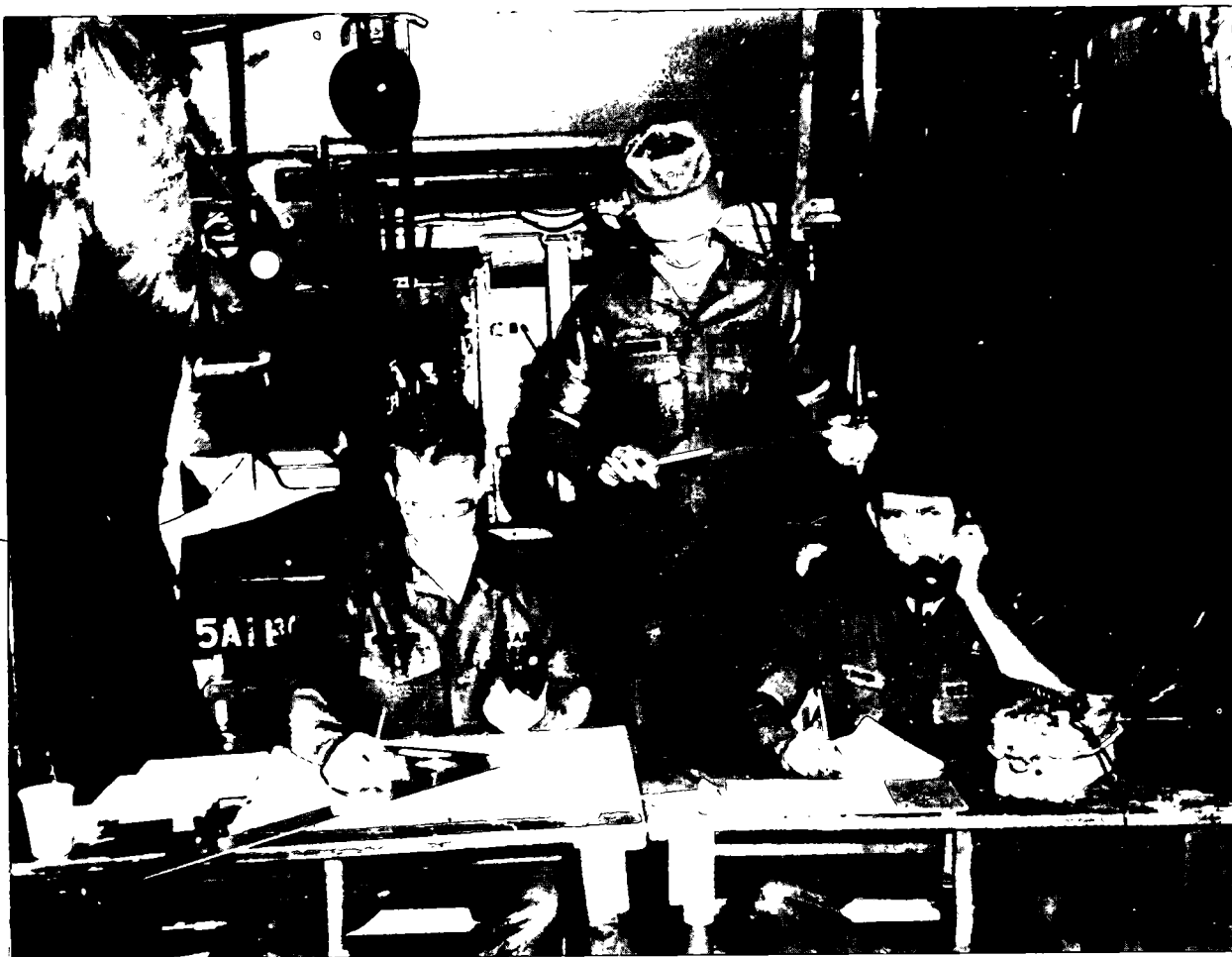
AVIATOR'S RECOGNITION MANUAL

filed with 100-21
Army Studies



FM 1-88 ●

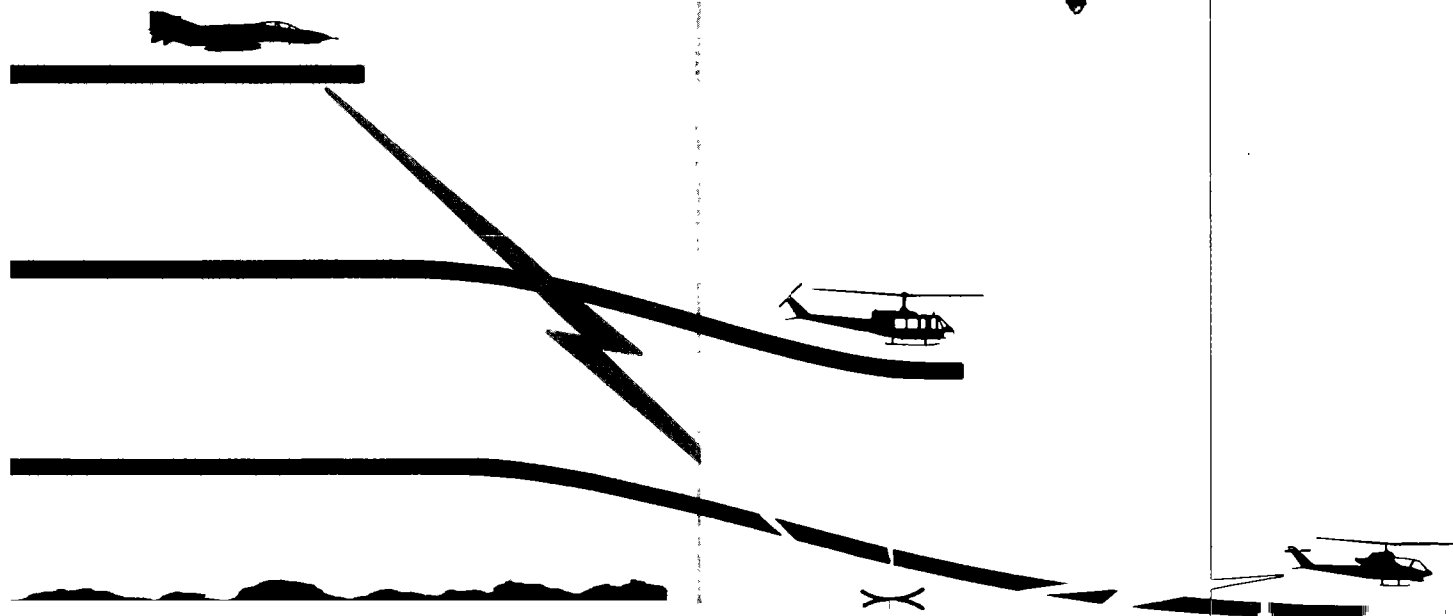




Again, the important thing is to know these organizations exist and they are there to help make the airways easier to navigate through—not to complicate the mission. Some individuals may never deal with these facilities because they are involved in frontline operations. What does all this mean to the individual pilot? It means a detailed briefing, given by the appropriate supported agency, and a call to his operations should take care of any coordination/interface problems he can imagine.



corps airspace control system



system description

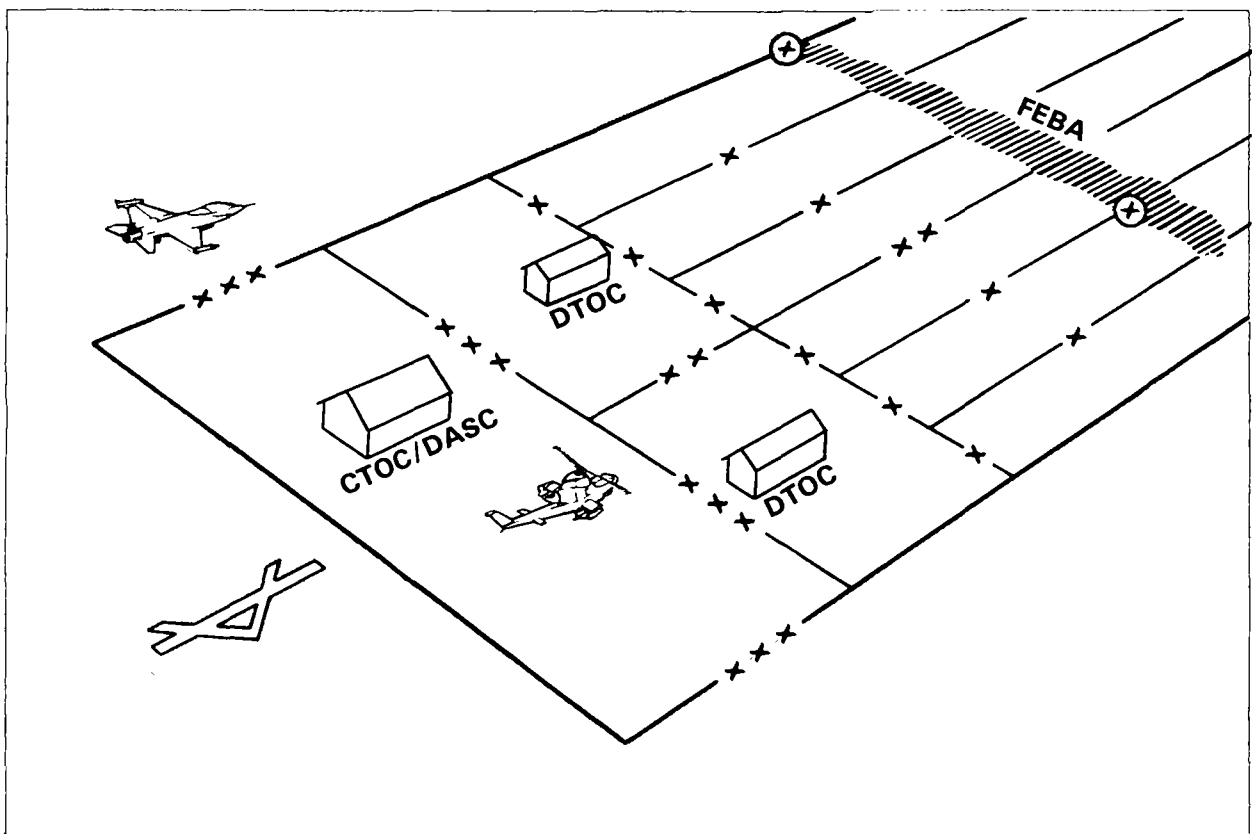
The corps airspace control system incorporates all Army personnel facilities, policies, and procedures involved in airspace management. It must provide for the coordinated use of airspace by combat, combat support, and combat service support units, and for the effective use of airspace in support of the corps assigned mission.

The corps/division air defense officer, aviation officer, and fire support coordinator—along with other staff members under the supervision of the G3—plan for the coordinated, integrated, and regulated use of airspace in the combat zone. Airspace management rules and procedures are established and issued to all major subordinate units affected. These rules and procedures are based on the commander's guidance and the broad procedures established by the airspace control authority (ACA). They must allow subordinate units the degree of flexibility required to support their operations.

Airspace management procedures address a trade-off between the freedom of action required to do the job and risk that is acceptable in light of the tactical situation.

army facilities

Tactical Operations Center (TOC)—The corps and division tactical operations centers are the command installations where necessary personnel and communication facilities are grouped to accomplish centralized combat and coordination of current tactical operations. The TOC is neither a formal military organization nor a separate agency or level of command. It is formed solely from resources of the command as an operating element to accomplish timely staff actions on matters concerning current operations. It has no fixed composition, but normally includes those elements and personnel considered necessary to perform recurring functions and includes elements that assist in coordinating all planned airspace management functions.



Tactical operations center facilities.

Airspace Management Element (AME)—The AME is an element within the corps and division TOC and is under staff supervision of the G3. Its primary purpose is to accomplish airspace management functions among Army airspace users and with other Services. The AME is a manual planning-and-management element and has limited information-handling capabilities. Manning of the AME may include an air defense officer, an aviation officer, and supporting operations and clerical personnel. The AME recommends how the commander's airspace requirements can best be met. User activities and requirements differ between the division area and corps rear area and, in this respect, the functions of the AME will differ accordingly. The AME—

The AME determines how the commander's airspace requirements can best be met.

Coordinates the use of airspace.

Coordinates Army air defense artillery operations.

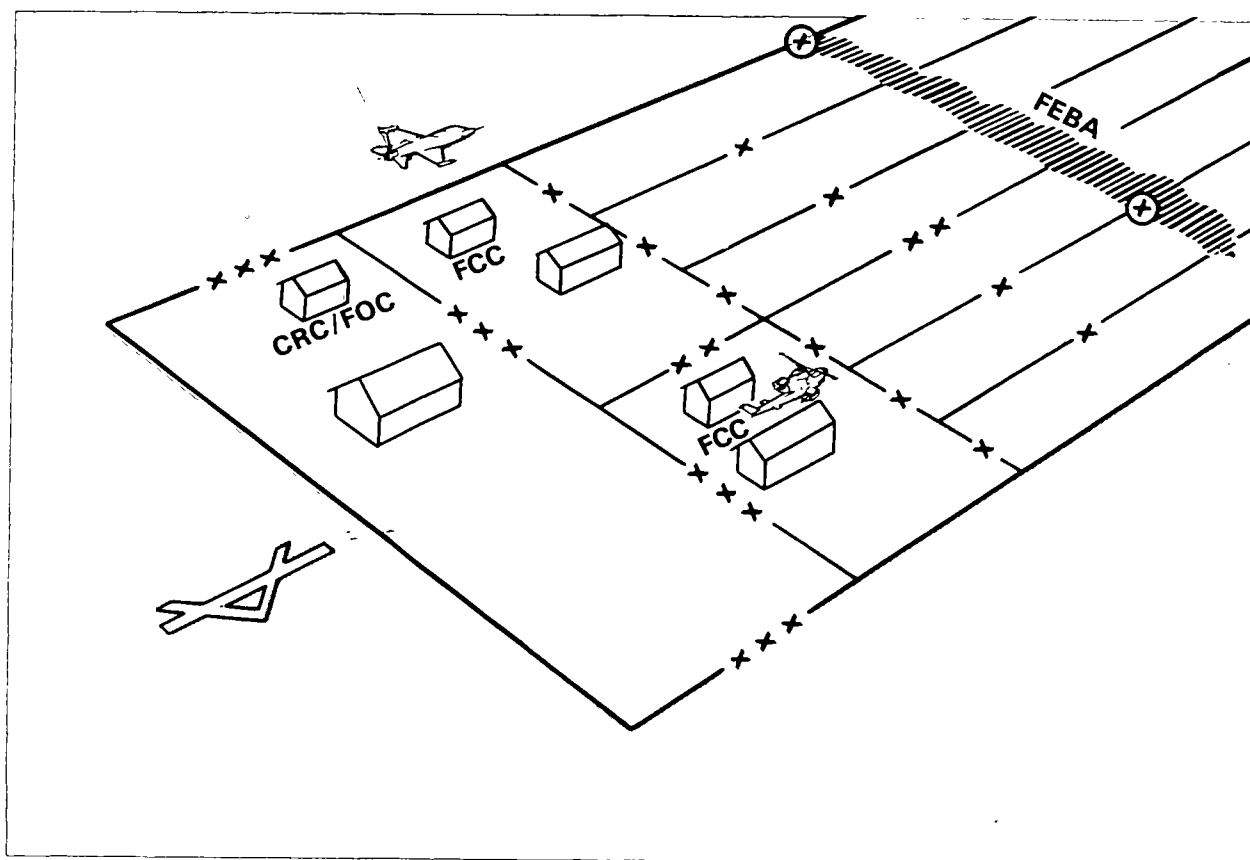
Coordinates Army air traffic.

Provides information on aviation status and recommends the allocation and re-allocation of Army aviation resources.

Provides intelligence obtained through air defense channels.

Army Air Traffic Control Facilities—A network of flight operations centers (FOC), flight coordination centers (FCC), approach/departure control facilities, airfield control towers, and navigational aids is provided throughout the area of operations for the control and coordination of Army air traffic. The airspace management liaison section (AMLS) at the tactical air control center (TACC) and control and reporting center (CRC) coordinates the integration of Army air traffic control facilities with other Service component control facilities. Coordination of Army air traffic with other Service component air traffic and integration of Army air traffic in to and out of division areas normally are accomplished by these Army air traffic control facilities. These facilities provide the required Army enroute and terminal services, and should not duplicate those services that can be provided by the facilities of other Service components or existing facilities of the host country.

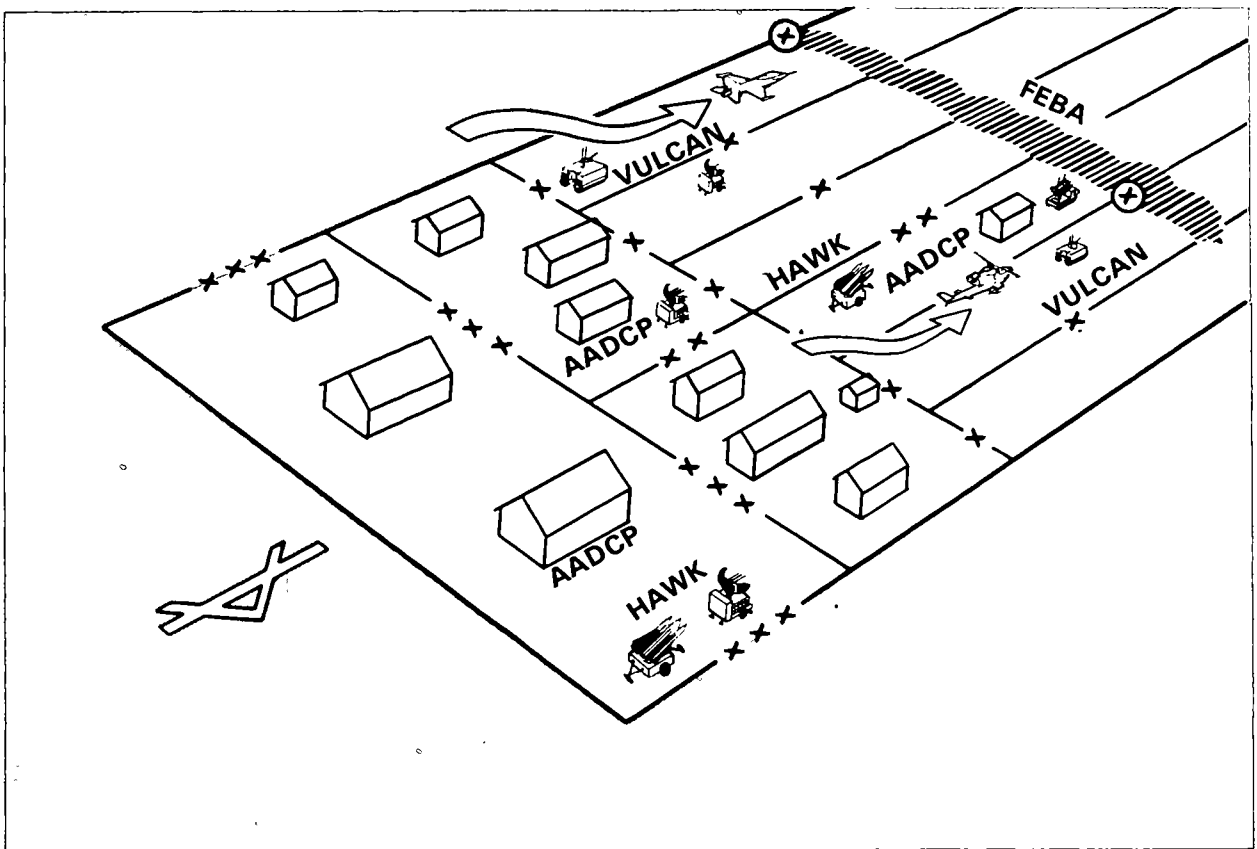
Army ATC units should not duplicate the facilities of other Services.



Army air traffic control facilities.

*AADCPs are tied to the
USAF CRC.*

Army Air Defense—Army air defense fire units are controlled from Army Air Defense Command Posts (AADCP). The AADCPs are established at Army air defense group and battalion levels. The AADCPs coordinating the fire of Hawk and Hercules fire units are supported by local radars and semiautomatic command and control systems which are tied to the control and reporting center or the control and reporting post of the sector. Chaparral/Vulcan AADCPs are manual and depend on voice communications and procedural methods for control. AADCPs are key airspace control facilities in both the corps rear and division areas. They become integral parts of the airspace control system by virtue of their inclusion in the area air defense system.



Army air defense facilities.

Maneuver Brigade/Battalion—At brigade and battalion levels, airspace management is accomplished primarily by procedural, communication, and visual control means. At these levels, airspace management and fire support coordination functions are closely interwoven and involve detailed coordination and integration of tactical air, indirect fire, organic and supporting air defense, and tactical fire and maneuver operations. Those individuals directly involved in the conduct of localized combat operations—battalion and company commanders, fire support coordinators, air liaison officers, and forward air controllers—perform airspace management functions as part of the corps airspace control system.

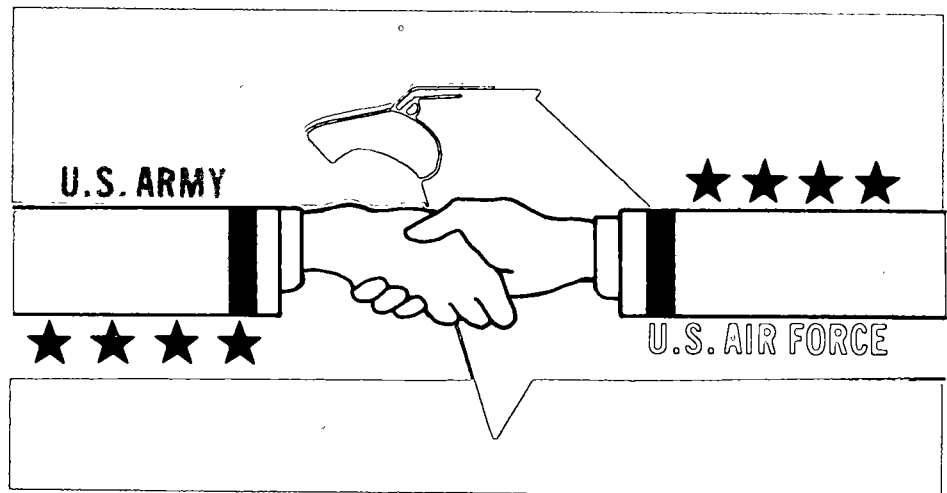
Airspace management is accomplished by procedural, communications, and visual means.

agreements

The procedures described herein reflect certain fundamental Army-Air Force joint agreements:

- Each Service component within a joint force has requirements to operate aircraft or weapons systems within the airspace in the performance of assigned missions.
- Joint operations in complex combat environments cannot be effective if conducted under complicated, overly restrictive control procedures for airspace use near the line of ground force contact.
- Procedures should be as simple as possible and based on the principle of management by exception.
- Fire support coordination must not inhibit the employment of supporting fires demanded by the tactical situation.
- Army aviation operations must have freedom of movement in the forward area and normally will be conducted in a procedural control environment.
- The ability to rapidly shift and concentrate the employment of air assets will be essential to the success of air-land operations.
- Mutually acceptable joint procedures eliminate requirements for duplicative equipment and capabilities for airspace control.

*FM 100-42 is the joint
USAF US Army
agreement.*



airspace restrictions

Operational factors may generate requirements for airspace restrictions to be applied to the use of segments of airspace within the area of operations to accommodate specific operational requirements of component forces. The

use of airspace restrictions must be minimized. The restrictions will be evaluated on a case-by-case basis, be temporary in nature, and be limited in time and space.

Commanders will inform the airspace control authority of their requirements for airspace restrictions. The request will include the time period during which the airspace restriction will apply. The airspace control authority will coordinate all requests in consideration of the impact of such airspace restrictions on other airspace users. Airspace management liaison sections will continuously monitor the status of airspace restrictions and initiate action to delete them when the need for their establishment is terminated.

Use of airspace restrictions must be minimized.

The horizontal and vertical limits of airspace restricted areas, effective times, procedures for movement of aircraft to and from adjoining airspace, procedures for coordination of flight information and dissemination of warnings involving flight safety hazards will be precisely defined by the airspace control authority.

When airspace restricted areas or other restrictions have been authorized, the air traffic control/airspace control facility responsible for controlling the air traffic will coordinate instrument flight plans with the airspace management center and with adjacent airspace control facilities and provide separation of all aircraft in instrument meteorological conditions operating within or transiting the restricted airspace.

For flight operations conducted in visual meteorological conditions over friendly territory solely within a designated airspace restricted area, the commander for whom the restriction was established will determine when flight plans are required. A determination that flight plans are not required does not relieve the appropriate air traffic control facility of the requirement to monitor movements of aircraft within the airspace restricted area and to maintain a capability to clear aircraft from the area for air defense purposes or to provide information for rescue purposes.

identification requirements

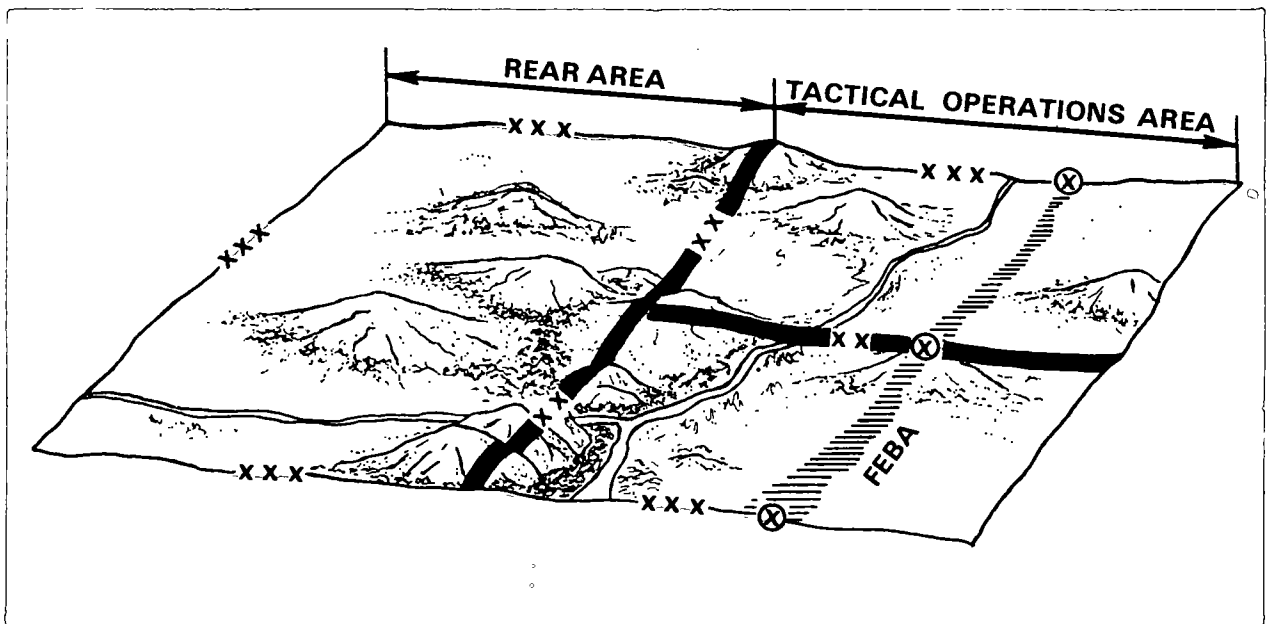
The air traffic identification requirements for airspace control must be compatible with air defense identification requirements. Identification of friendly aircraft by air defense means promotes effective airspace control, timely engagement of enemy aircraft, conservation of air defense resources, and reduction in risk to friendly forces and facilities. Monitoring air-movements by electronic methods normally will provide the most rapid and reliable means of identification and will facilitate flexibility of aircraft employment in an area of operations. Electronic identification should, therefore, be used when available. However, when one or a combination of factors preclude electronic monitoring and identification, visual or procedural means of identification may be used.

rear and tactical operations area

Based on general patterns of air traffic flow and the types of combat activities therein, the combat zone can be divided into two areas—the rear operations area and the tactical operations area. The boundary between the tactical and rear operations area normally will be the frontline divisions' rear boundary. Procedures for airspace control must reflect the differences in traffic flow and characteristics and complexities of air operations in each area.

In the rear operations area, Army air traffic will be predominantly along an axis perpendicular to the forward edge of the battle area (FEBA) in transit between forward and rear. This area is more definitive in terms of traffic movements and electronic control.

Air traffic in the tactical operations area will be both parallel and perpendicular to the FEBA and characterized by the need for rapid and flexible response to both air and ground commanders' requirements. Freedom of movement throughout the area is necessary. The required flexibility for tactical operation and the potential density of air traffic make individual reporting neither feasible nor desirable. However, the coordination of information reflecting the intensity of Army aviation activity is an important conflict-avoiding tool.



aircraft coordination

To effectively provide airspace control in an area of operations, air traffic control/airspace control facilities must have a capability for air traffic identification and control and for receipt and dissemination of information on activity involving use of airspace. Coordination is required between facilities of the airspace control system and component command and control elements to prevent unnecessary disruption of other activities.

The coordination of information pertaining to component Services' flight operations, air defense operations, and indirect surface-to-surface fires that may create potential conflicts in the joint use of airspace normally will be accomplished at the lowest level of the airspace control system having the capability to prevent or resolve conflicts.

Both rotary-wing and fixed-wing aircraft have a requirement to operate in the low and medium altitude structure. Coordinating procedures are required to reduce interference between friendly aircraft operating in areas of intense activity, airspace control facility degradation, or excessive enemy jamming of communications/radar while expediting safe, orderly, and effective combat employment of all aircraft.

Remotely piloted vehicles (RPV) may also be employed in an area of operations. Each Service component is responsible for coordinating its RPV activities when they affect other airspace users. Flight data for RPV operations will be provided to appropriate airspace control facilities.

Both rotary-wing and fixed-wing aircraft operate in the low and medium altitude environment.

indirect fire support coordination

The following considerations form the basis for the development of coordination procedures incorporating indirect fire support:

- The intensity, duration, and location of friendly fires are tied to the tactical situation and, therefore, are not generally predictable.

Coordinate conflicts in fire support at the lowest level.

- The Army command, control, and communication system does not currently possess the capability to collect, categorize, and disseminate timely artillery information with respect to intensity, duration, location, and maximum ordinate of friendly indirect fires throughout the entire tactical area of operations.

- The highest probabilities of conflict between aircraft and indirectly delivered supporting fires occur at relatively low altitudes in the immediate vicinity of firing unit locations and target impact areas. With the exception of these two areas, the probability of aircraft and indirect fire conflict is relatively low.

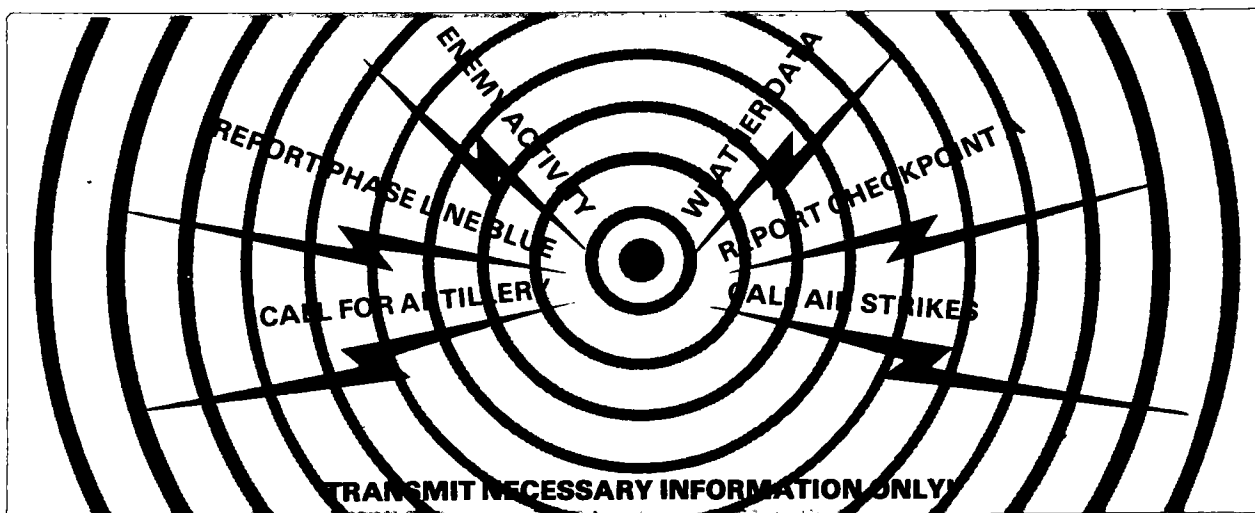
- Indirect fires normally will not be interrupted because of potential conflict with aircraft traffic.

- Consistent with mission requirements, tactical aircraft will avoid areas of high-risk, indirect-fire conflict. Conversely, high-priority tactical aircraft missions will not be delayed because of potential conflicts with indirect fire support.

- Consistent with the above considerations, the following apply to indirect fire support/airspace control coordination:

In order to reduce the potential conflict between indirect fires and tactical aircraft, the requirement exists for coordination of information pertaining to indirect fire support activity at the lowest level having the capability to resolve the conflict.

Since the reporting of all indirect fire support data would not be timely, coordination procedures must be based primarily on pre-established fire plans, updated to the maximum extent possible, and consistent with field artillery system capabilities and airspace control requirements.



coordinating altitude

In order to reduce the conflict between rotary-wing and fixed-wing aircraft, an airspace restriction—for specified areas—in the form of a coordinating altitude may be designated by the airspace control authority.

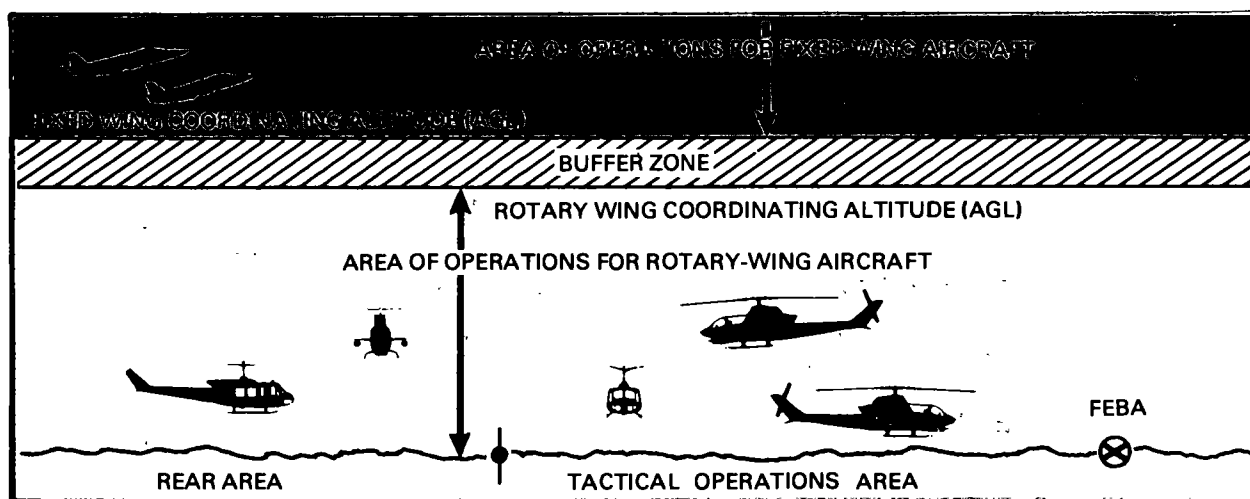
Rotary-wing aircraft normally will operate below the coordinating altitude, and fixed-wing aircraft normally will operate above it. The coordinating altitude assigned to rotary-wing aircraft may be below the altitude assigned to fixed-wing aircraft if a buffer zone is desired.

Rotary-wing aircraft penetrating the altitude will notify the flight operations center, flight coordination center, or any other available airspace control facility, who, in turn, will notify the airspace management liaison section at the control and reporting center.

Fixed-wing aircraft penetrating the altitude will notify an appropriate tactical air control system element, who, in turn, will pass this information to the airspace management liaison section at the control and reporting center.

Approval or coordination acknowledgment is not required prior to penetration of the coordinating altitude from either above or below. This coordination procedure does not connote an approve-disapprove process nor the designation of block airspace. Conflict avoidance is basically “see-and-be-seen” during visual meteorological conditions.

The height of the coordinating altitude above ground level (AGL) will be based on the tactical situation, mission requirements, and capabilities of the Services involved. Penetration of the coordinating altitude by close air support sorties, flown in response to Army request, is coordinated by the forward air controller or other tactical air control system elements.



Area of operations for fixed-wing and rotary-wing aircraft.

minimum risk routes (mrr)

To facilitate Air Force planning for high-speed aircraft to transit the tactical operations area at low altitudes, minimum risk routes may be established by the airspace control center. The airspace control center will establish the number of recommended MRRs to be submitted and procedures for changes and cancellations. The corps will provide the airspace control center with recommended MRRs and information on significant activities affecting airspace not previously identified as airspace restricted areas. Also the corps will maintain a current MRR-status display, based on MRRs established by the airspace control center. As a minimum, establishment parameters for minimum risk routes will include:

- Coordination of MRRs with air defense procedures and rules of engagement.
- Indirect and air defense firing unit locations.
- Ground maneuver and fire support planning.
- Terrain.
- Known enemy indirect and air defense fire capabilities.
- Areas of significant airborne or Army aviation activity.

MRRs ARE PRIMARILY
FOR AIR FORCE USE.

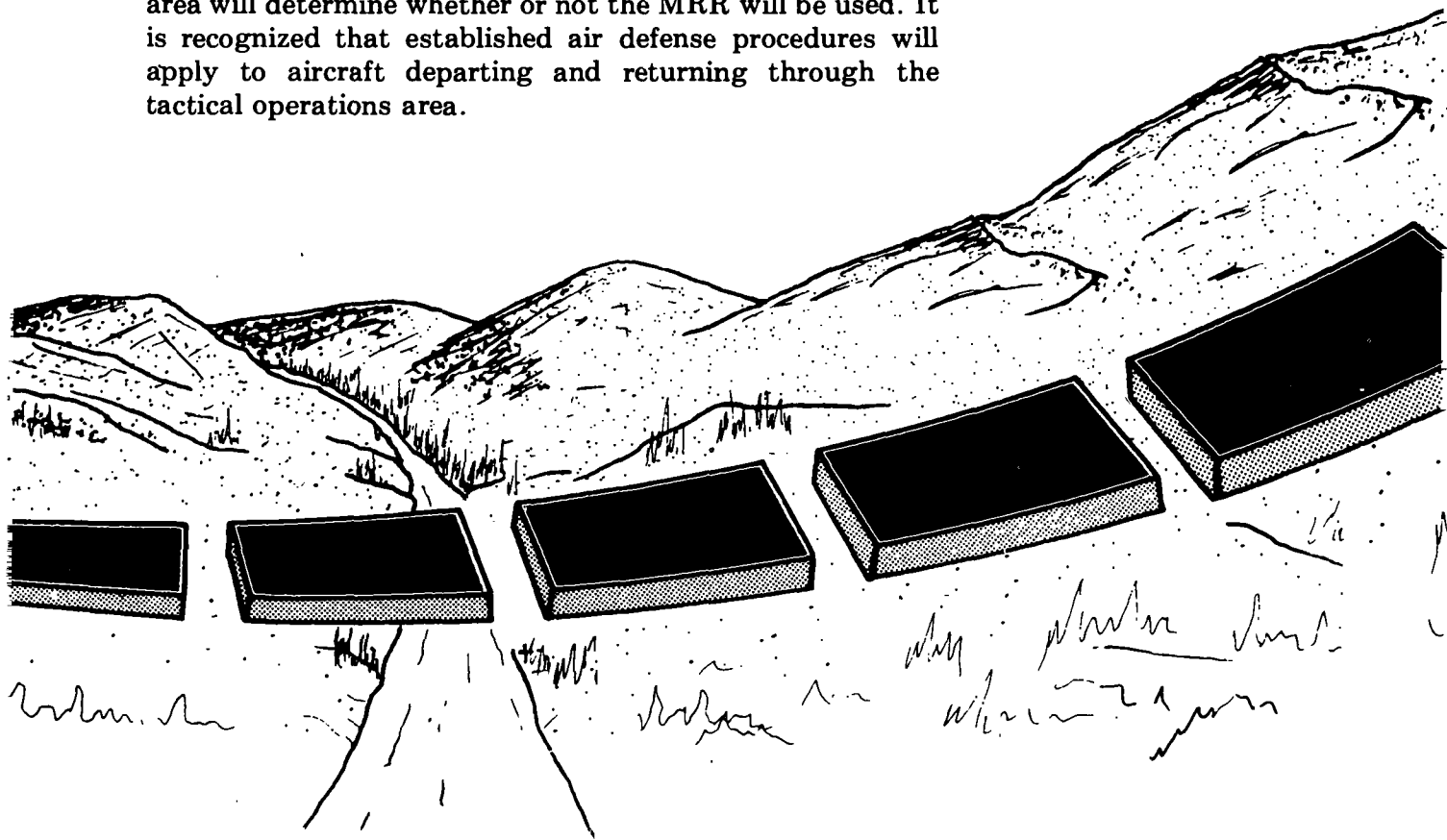


The tactical air control center will forward established MRRs to tactical air control system elements, tactical unit operation centers, and corps airspace management elements. The control and reporting center will use a current display of established MRRs to reduce potential conflicts with tactical aircraft missions. The control and reporting center will advise the flight operations center of known conflicting aircraft movements and request updated information affecting established MRRs.

The airspace management element at corps and division—in coordination with the tactical air control party—will provide tactical air control system elements with information concerning known significant Army activities.

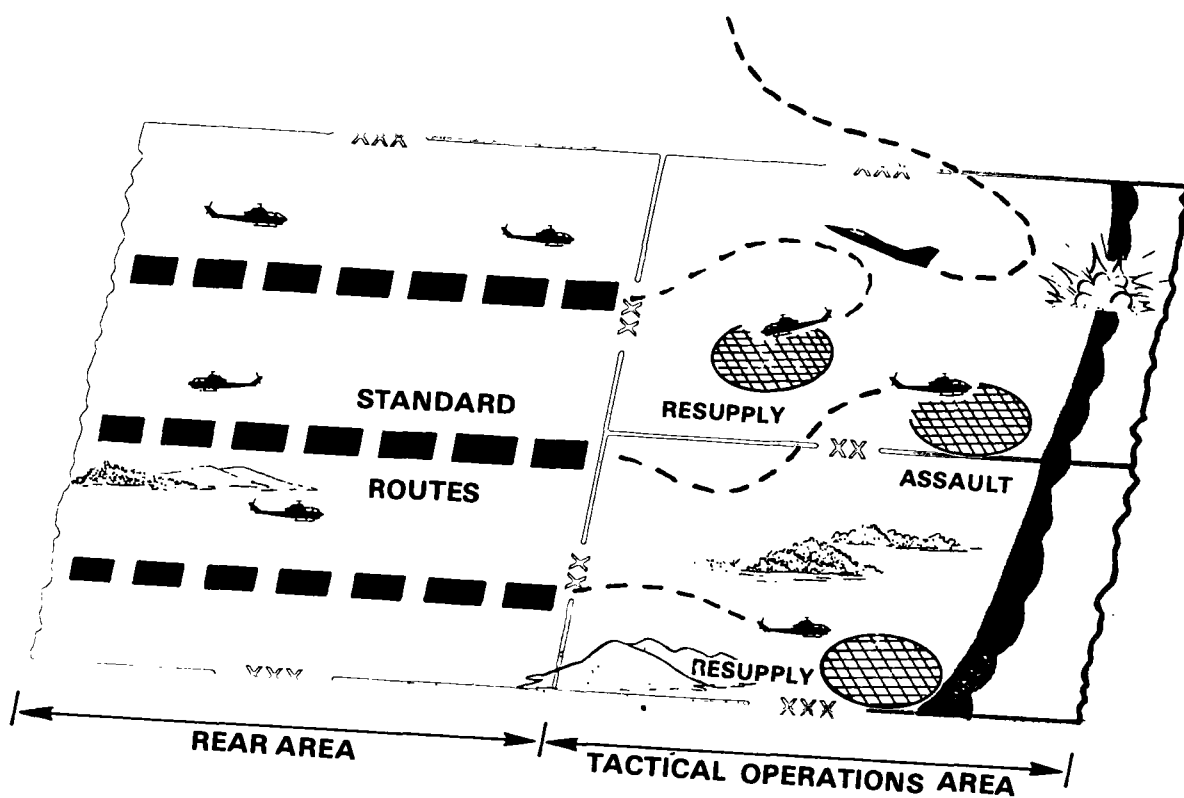
The corps airspace management element will provide recommendations that MRRs be updated, altered, and/or canceled based upon changes in the tactical situation.

Based on flight plan information, suitability of an MRR to mission requirements, degree of acceptable risk necessary for mission success, and the control and reporting center recommendations, aircraft transiting the tactical operations area will determine whether or not the MRR will be used. It is recognized that established air defense procedures will apply to aircraft departing and returning through the tactical operations area.



standard-use army aircraft routes

The corps airspace management element, in coordination with the airspace control center, will establish standard-use Army aircraft routes through the rear operations area to designated points in the tactical operations area.



During visual meteorological conditions, Army aircraft movements in the rear operations area will use these standard-use Army aircraft routes to the extent practicable, following prescribed air traffic control procedures.

Army aircraft movements in the rear operations area conducted during instrument meteorological conditions will comply with established instrument flight rules (IFR) procedures.

Under VMC, use standard routes whenever possible.

The flight operations center will be the focal point for the collection of Army aircraft movement data in the rear operations area and will interface with the control and reporting center.

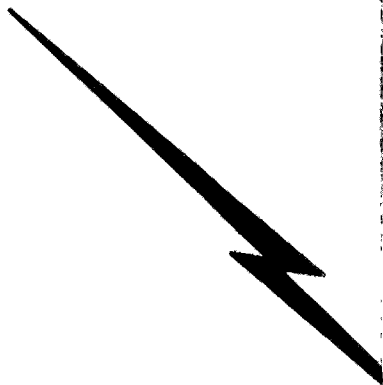
The control and reporting center will insure that Air Force aircraft avoid standard-use Army aircraft routes to the extent practicable and will advise both the flight operations center and Air Force aircraft of potential conflicts.

airfield terminal control

Component commanders will forward to the airspace control authority their requirements for terminal control zones associated with airfields that they operate, along with desired procedures for flight coordination and transfer of control of flights into and from these airfields. The airspace control authority will coordinate the establishment of airfield terminal control zones and procedures in recognition of the stated requirements and in accordance with the guidance of the joint force commander.

The ACA coordinates control zones and procedures.

army airspace management procedures



introduction

The principles of and organization for airspace management in the combat zone are the same for the divisions and corps; however, the types and densities of airspace-user activities differ between the division area and the corps rear area. The procedures discussed in this chapter are generally applicable at both corps and division levels. These procedures are necessary to implement the joint agreements, procedures, and coordination requirements discussed in the previous chapter. A sample division SOP contained in appendix D serves to illustrate the implementation of these procedures.

airspace conflict resolution

Normal operational planning and execution and adherence to SOP should prevent most conflicts between airspace users; however, exceptions must be resolved on-the-spot. The maneuver unit commander must establish priorities for the use of airspace. These serve as the guidelines for resolution of conflicts by the airspace coordinators and users. Initial priorities are published in SOP and operation orders with subsequent changes disseminated as necessary. If a conflict cannot be resolved by established priorities, the commander will be advised of the conflict. The commander's decision, which will vary with the mission, enemy capabilities, and support requirements, will then be passed to the elements concerned. When time or circumstances do not permit SOP or command resolution of conflicts, conflict situations presenting immediate safety hazards to friendly forces will be resolved by the coordinator/controller detecting the conflict.

The commander's conflict resolution decisions will vary with the mission, enemy capabilities, and support requirements.

A selected representative may be designated and given authority to assign airspace priorities for the commander at brigade and battalion levels.

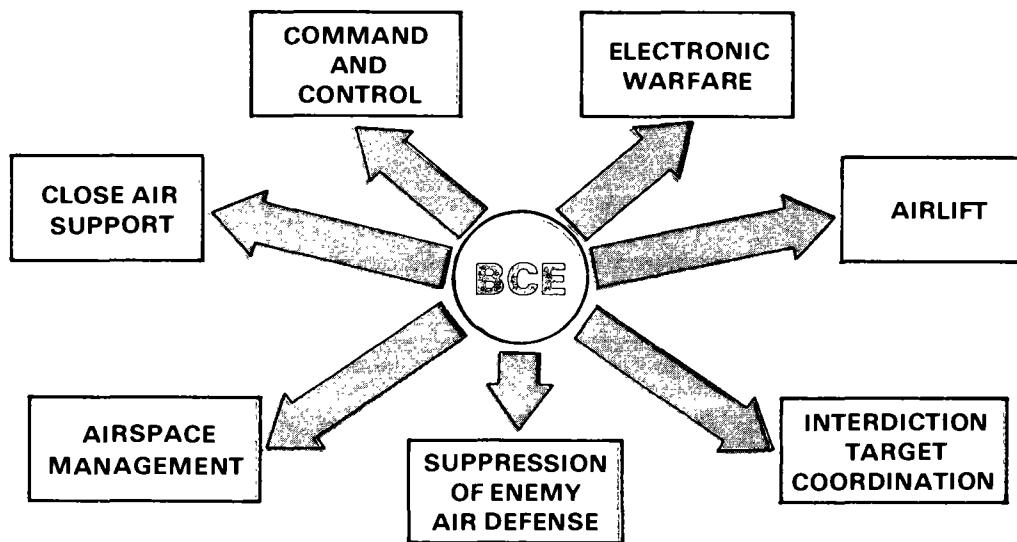
The commander or his designated representative will approve use of airspace in support of preplanned operations.

Subordinate unit commanders—as well as coordinators, controllers, and operators—will be given authority to make on-the-spot adjustments in airspace operations to preclude unnecessary hazards to friendly forces.

Control rules and procedures, delineation of detailed responsibilities, and communication instructions will be provided in SOP and operation plans and exercised in the field prior to hostilities.

corps-air force interface

Integration of corps activities with the Air Force is achieved by an Army battle coordination element (BCE) for operations and intelligence located at the tactical air control center (TACC). The BCE advises the USAF on matters such as command and control, electronic warfare close air support, airlift, airspace management, suppression of enemy air defense (SEAD), and interdiction target coordination. The organization of the BCE allows for Army representatives to be located in the current plans, current operations divisions, and those intelligence divisions of the combat intelligence center (CIC) in the TACC.



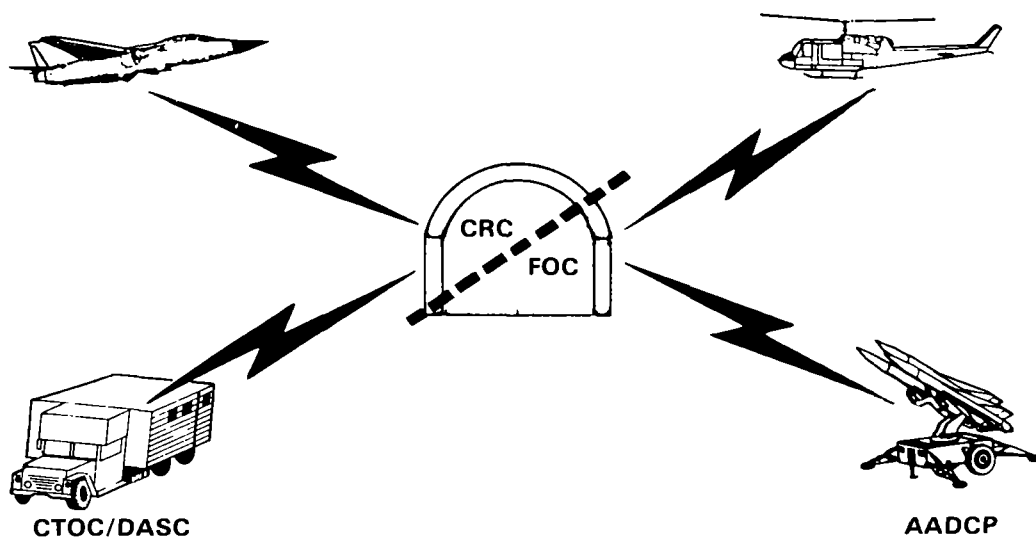
The BCE coordinates Army activities with the USAF.

The BCE enhances information exchange and interprets land operations for the benefit of the Air Force component commander. The BCE will be augmented as necessary with personnel from corps units, such as the air defense artillery (ADA) groups and the air traffic control organization supporting corps. All augmentees become members of the BCE and operate under the supervision of the senior officer of the BCE.

The process of coordinating corps airspace activities with other Service components involved will be accomplished through the airspace management liaison section (AMLS) as prescribed by the airspace control authority (ACA). The corps representatives to the AMLS are members of the battle coordination element and are responsible for coordinating corps requirements to operate aircraft and/or weapons systems within the airspace over the corps for the performance of the corps assigned mission.

Air defense artillery and Air Force operations are coordinated to prevent mutual interference, to exchange intelligence information, and to insure the safety of friendly aircraft from air defense artillery fires. In addition, air defense artillery liaison and communications are established between the control and reporting center (CRC) and the corps air defense artillery group, Army Air Defense Command Post (AADCP).

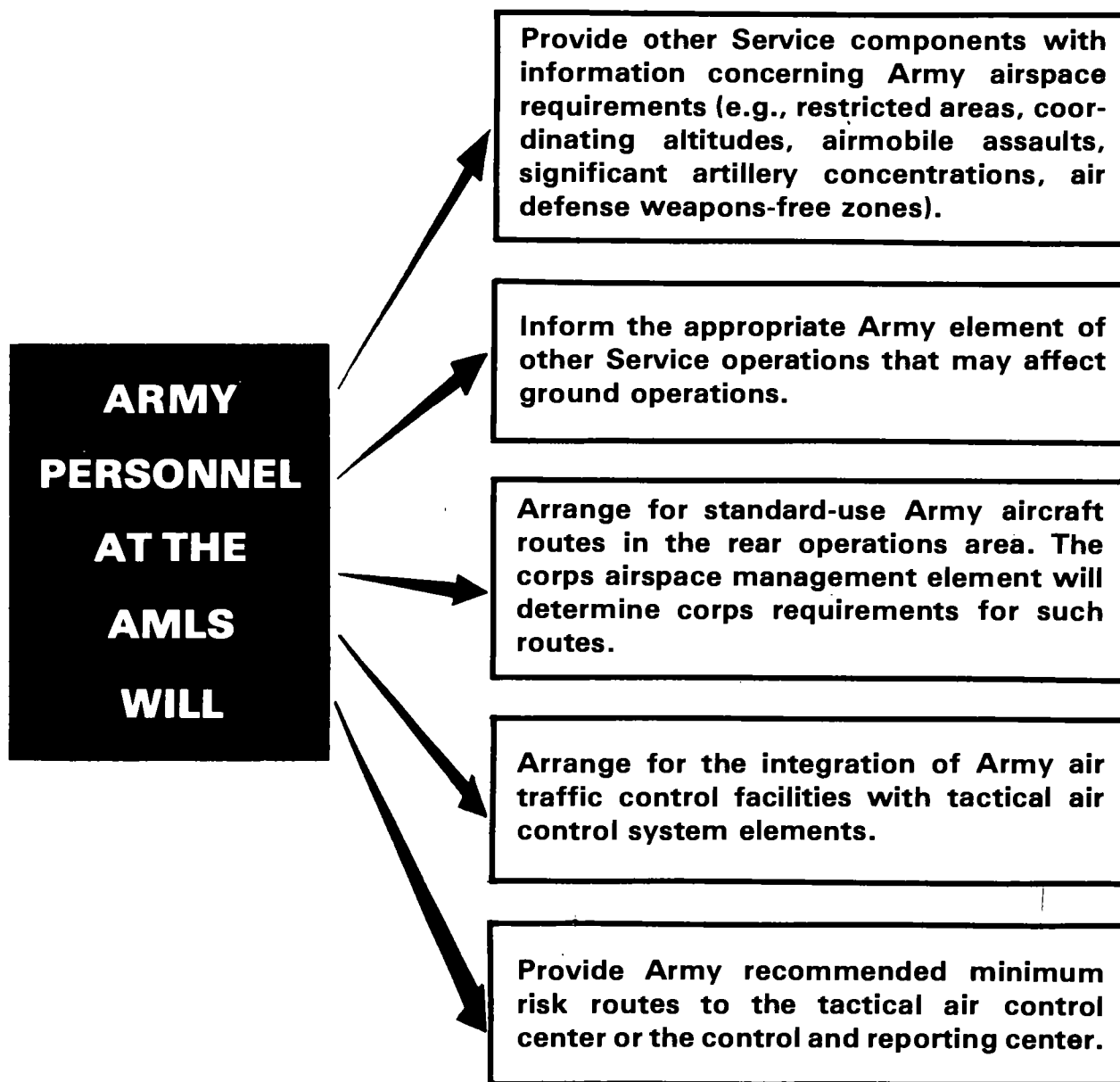
The corps flight operations center (FOC) is collocated with, or electronically connected to, the CRC. The FOC serves as the primary interface with the CRC in the control of Army air traffic when this traffic comes under the purview of the FOC.



FOC interface.

airspace management liaison section (amls)

Army personnel at the AMLS are the corps commander's representatives responsible for the coordination and integration of Army airspace-user requirements with those of other Service components.



division and corps airspace management functions

FUNCTIONS—The functions discussed below apply in varying degrees to the corps and division levels. User activities and requirements differ between the division area and corps rear area and, in this respect, airspace management functions will differ accordingly.

The five basic functions of airspace management are:

- **Coordinate the use of airspace.**
- **Coordinate Army air defense artillery operations.**
- **Coordinate Army air traffic.**
- **Provide information on aviation status and recommend the allocation and re-allocation of Army aviation resources.**
- **Provide intelligence obtained through air defense channels.**

The AME in conjunction with the fire support element and the tactical air control party determines how airspace requirements for a planned operation can best be met, then submits recommendations to the G3 for approval and issues necessary instructions. The AME normally prepares the airspace utilization annex to operation plans/orders and maintains airspace utilization displays.

Typical displays combine Army air defense, Army and Air Force air support, and indirect fire support information to the maximum degree feasible. Data is maintained on air traffic control facilities and on standing and temporary regulatory or restrictive measures. Conflicts that cannot be resolved in accordance with command guidance, orders, and

**COORDINATING
THE USE OF
AIRSPACE**

SOP are forwarded to the G3. The tactical air control party or other action initiator and AME coordinate continually to avoid airspace conflicts between the Services. The coordinating altitude affects air traffic regulatory operations and may reduce—but does not eliminate—the requirement for coordination. Recommended minimum risk routes (MRR) will be provided to the AMLS at either the tactical air control center or the CRC.

COORDINATING AIR DEFENSE ARTILLERY OPERATIONS

The airspace management element (AME) maintains continuous estimates of the air defense situation and represents the air defense commander in preparing recommendations for changes in the allocation and employment of Army air defense means. The AME provides information on the air defense situation, including air defense coverage, to other tactical operations center elements. Periodic and spot reports from air defense artillery units allow the AME to remain abreast of the air defense situation. When specific details are required, information is requested from the appropriate air defense artillery unit headquarters. Information about the number of operational air defense weapons and their deployment is provided by the air defense artillery battalion, Army Air Defense Command Post (AADCP). Redeye information—in summary form—is received from the brigades, field artillery battalions, and cavalry squadrons. The AME assists the commander in regulating air defense weapons fires and preventing undue interference with other operations by advising on the air defense weapons control status and by recommending changes to the SOP for air defense operations.

COORDINATING ARMY AIR TRAFFIC

The AME coordinates Army air traffic by promulgating information on restricted areas and other restrictions imposed on air traffic by the commander or higher headquarters. On the basis of these restrictions, the AME disseminates aviation control guidance (corridors, altitudes, areas in which all flights must be cleared) and provides information for the preparation of the air route overlay to be included in the airspace utilization annex. On approval by the G3, the plan is disseminated to the tactical operations center, the direct air support center, the appropriate

FOC/FCC and the Army aviation and air defense units as required. Through close coordination with other tactical operations center elements, the AME determines which combat and combat support activities will influence air traffic and disseminates changes to the airspace utilization annex. The corps G3 will determine requirements for standard-use Army aircraft routes in the rear operations area. The route requirements will be provided to the AMLS at the CRC for coordination.

The AME maintains continuous estimates of the aviation situation and assists the division aviation officer in preparing recommendations for changes in the allocation and employment of aviation assets. The AME provides information to other tactical operations center elements on aviation resources controlled by or available to the corps/division. Corps and division aviation units provide aircraft status reports to the aviation sections.

**PROVIDING
INFORMATION ON
ARMY AVIATION
RESOURCES**

Air defense intelligence (hostile air activity data) obtained through air defense channels is provided by the AME to other elements of the tactical operations center. The AME receives intelligence information from the division AADCP and the Hawk battalion liaison officer at the division tactical operations center (DTOC).

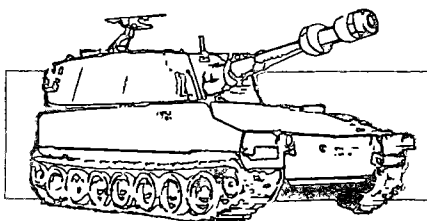
**COORDINATING
AIR DEFENSE
INTELLIGENCE**

army air defense artillery

Air defense artillery fires are controlled by air defense rules and procedures established by the area air defense commander. These fires are controlled to insure efficient engagement of hostile aircraft, prevent engagement of friendly aircraft, prevent air defense artillery and aviation mission interference, and to prevent incidents prior to an outbreak of hostilities. FM 44-1 contains a discussion of the control of air defense fires. Air defense unit command posts and the force G2/S2 have the basic responsibility for disseminating information regarding hostile aerial activity.

fire support

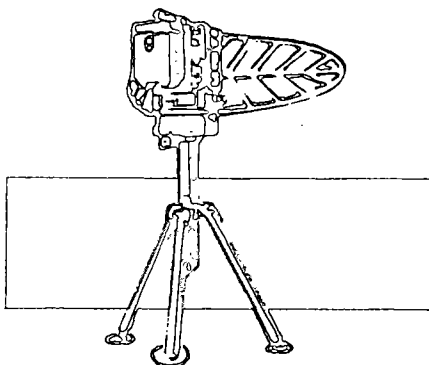
Field artillery support plans, firing battery locations, and significant intensities of fire are provided to the division airspace management element (DAME) by the fire support element. Since the intensity, duration, and location of indirect fire support are tied to the tactical situation and are not generally predictable, reports at division level of detailed artillery fires are not timely or usable.



At brigade/battalion levels, the supported unit commander, fire support coordinator, S3, and tactical air control party coordinate to the extent practicable to preclude airspace conflicts between indirect fires and aircraft operations.

communications

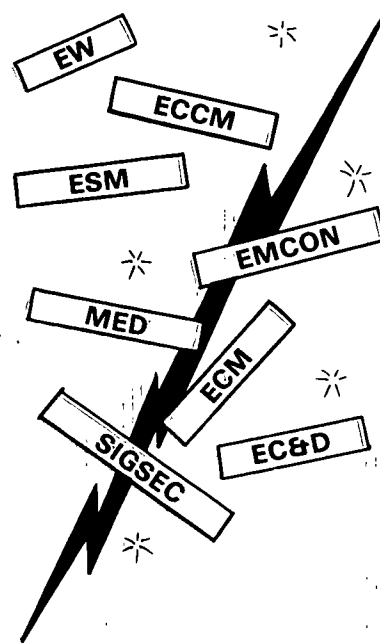
Complete, reliable, and compatible communication networks with sufficient priority to insure uninterrupted information flow are indispensable to the successful functioning of the airspace control system. Maximum use should be made of radar or other electronic means for identification and air traffic control services. When radar control is not possible or practicable—normally in the tactical operations area—identification and control will be accomplished by procedural methods. Standing operating procedures and operation plans/orders prescribe normal communications-electronics support for airspace management. Communications are integrated into a wide network to provide airspace management for Army and Air Force aircraft, air defense, and indirect fire means. Electronic assets organic to air defense elements may be used to support the airspace control system provided the capability to perform the primary purpose of these systems is not degraded.



Basic communications-electronics doctrine is contained in FM 11-50, FM 11-92, and FM 24-1. Airspace management communication requirements are met by use of the communication means available and, when practicable, by habitual collocation of airspace management and control facilities. Paragraph 4, Annex C to 3d Mech Div SOP 1 (app D), describes the Army air traffic control, aviation, and air defense radio nets used in the management of airspace at the division level.

electronic warfare

Aircraft navigation systems, air-to-ground missile guidance systems, and communication and noncommunication emitters are lucrative targets for electronic warfare. Airspace management planning must consider the application of electronic countermeasures such as jamming and deception to reduce the effectiveness of enemy surveillance and fire control equipment and electronic counter-countermeasures (to include antenna relocation and operating emitters at low power) to degrade enemy electronic warfare activities. (For detailed actions, see FM 100-32 and FM (C) 32-20.) Resources for electronic warfare support measures can be used to provide positive identification and location of enemy emitters and units. Of primary importance to airspace management is the requirement for close coordination between air and ground elements to insure that electronic countermeasure operations—particularly jamming—do not interfere with the airspace control system.



v

army air traffic control (atc)



general

Army air traffic control facilities will be integrated with Air Force air traffic control facilities to the degree possible to avoid duplication and to make maximum use of the ATC capabilities of both Services. The airspace control authority will prescribe the degree of facility integration based on requirements and equipment availability.

All Service components have a requirement to operate in the low and medium altitude structure. Therefore, the use of airspace and altitude restrictions must be minimized. Requirements for airspace restrictions will be evaluated on a case-by-case basis; when established, they will be temporary in nature and limited in space. Close liaison and coordination between all Service components/commanders must be established to insure an unimpeded flow of essential information concerning the use of airspace.

The ground commanders (corps, division) require freedom of use of airspace immediately over their forces for maximum flexibility to employ organic aircraft and weapons whenever land forces are committed to combat.

concept for army air traffic control units/elements

An air traffic control group, assigned to the Theater Army Communications Command, normally will be employed in support of a theater of operations or major task force.

The air traffic control (ATC) group provides the personnel and equipment to establish, operate, and maintain Army ATC facilities. The ATC group and its subordinate units are further discussed in appendix B of this manual.

A system of manual flight operations centers (FOC), flight coordination centers (FCC), approach/departure control facilities, airfield control towers, and navigational aids is provided throughout the corps area for the control and coordination of Army air traffic.

HAWK BATTALION

Normally, a Hawk battalion will be placed in direct support of each committed division; Hawk battalions in the combat zone normally are retained under the command and control of the senior air defense headquarters assigned to the corps. When a Hawk battalion is in the direct support of a division, the battalion radar capability may be exploited to provide air threat warning to the division and to assist in providing air traffic advisory/assistance services to aircraft on an exception basis.

PATHFINDER UNITS

Army pathfinder units provide navigational assistance and aircraft control services, as necessary, during any phase of an operation that requires sustained employment of Army aircraft. Pathfinders normally are used to select, improve, mark, and control landing/pickup/drop zones. They may also operate at forward helipads. The pathfinder facility maintains communications with aircraft and fire support units as necessary for control and coordination in the landing/pickup/drop zone area. Unit terminal guidance personnel may perform similar functions.

ATC COMPANY (FORWARD)

The air traffic control company (forward) is an element of the ATC battalion. It normally is employed with its platoons placed in direct support of corps and division aviation units operating airfields and/or heliports requiring ATC services. The ATC platoons operate from dispersed locations within an assigned area—normally a division—collocated with supported aviation units to enhance responsiveness. The ATC platoon leader is a liaison officer with the airspace management element (AME) of the DTOC.

In general terms, the air traffic control company (forward) provides terminal and enroute air traffic control, navigational aids, air warnings, and other assistance to aircraft operating in their area of assignment.

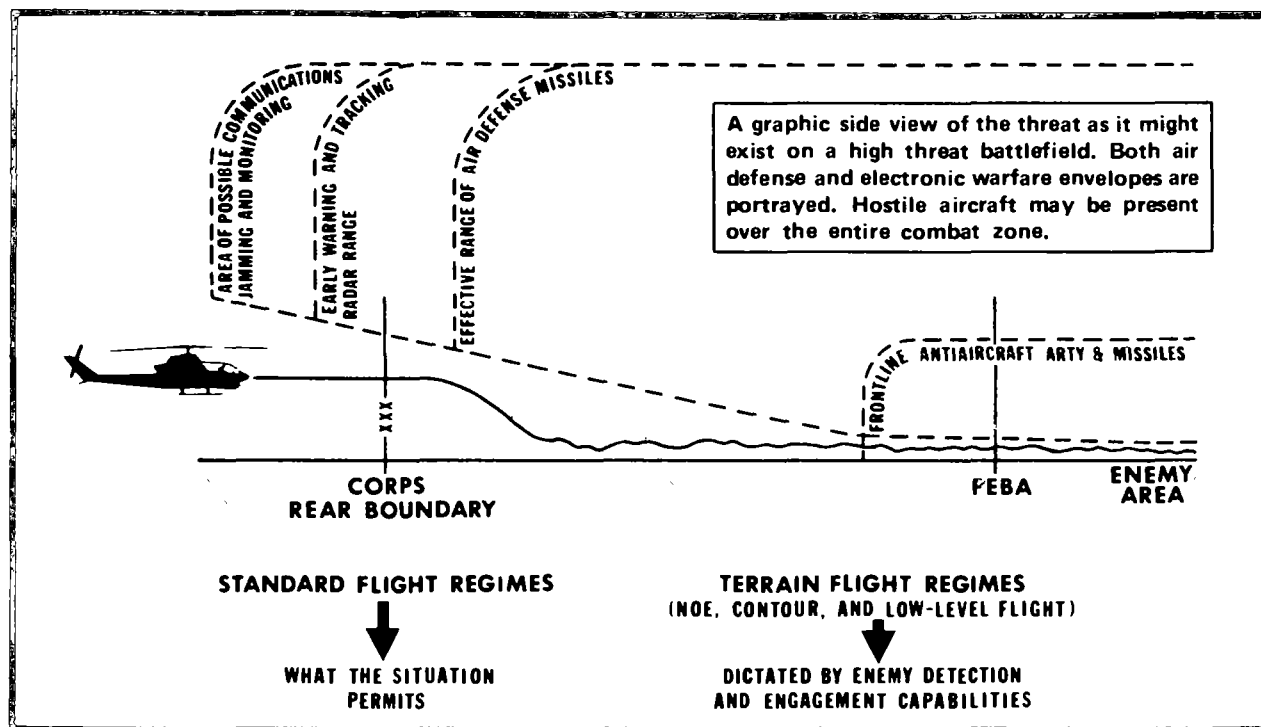
Tactical teams (tac teams) — During wartime operations, one team may be part of the ATC platoon. Three teams may be assigned to the division aviation battalion. Composition and capabilities of the ATC platoon tac teams and the organic division tac teams are the same. They are designed to provide advisory services, nondirectional beacon capability, and air traffic assistance at heliports or temporary landing areas such as medical evacuations, resupply points, or command post locations. Their use by the commander can enhance the effectiveness of his aviation units by adding one more tool to keep the airspace management system running smoothly.

TACTICAL TEAMS

concept of operations

Aircraft movements within an area of operation may be conducted under visual meteorological conditions (VMC) or instrument meteorological conditions (IMC), depending on the mission requirements, the weather and visibility situation, and the facilities available. Enemy threat considerations dictate the altitude levels at which Army aircraft will operate.

In the forward areas, enemy surveillance radar and air defense weapons capabilities will require Army aircraft to use terrain flying techniques. Aviators must take advantage of concealment afforded by terrain, vegetation, and manmade features. In rear areas, aircraft operations may be conducted at higher flight levels depending on the threat. However, whether in a forward or rear area, aviators must always take advantage of available terrain masking for cover and concealment to prevent observation or detection of the aircraft and its point of departure and landing.



Threat Profile.

The diagram above shows an example of how the air defense threat will appear on the modern battlefield. The illustration graphically shows the relationship of tactical flight in rear areas to tactical flight in the forward areas. As the aviator flies toward the forward edge of the battle area (FEBA), he must lower the flight altitude in order to remain below the air defense threat. He may be able to use standard instrument rules and procedures, if necessary, in rear areas. In the rear areas, the *effective range of enemy air defense missiles* and other weapons do not threaten him.

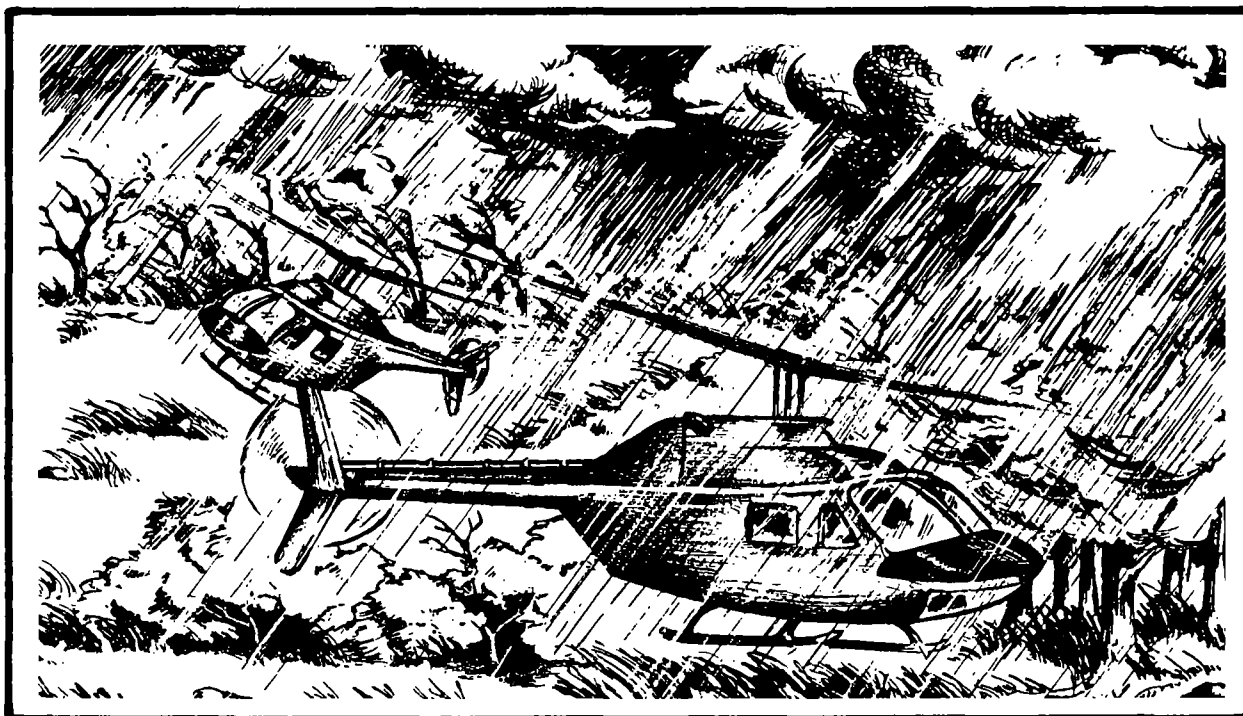
The aviator must constantly be alert to the threat of possible communications jamming and monitoring throughout the battle area. Nearer the forward edge of the battle area, he will be within the range of the enemy *early warning and tracking radar*. It is important for the aviator to be aware that he can be within this radar range even though he is still outside the effective range of the enemy air defense missiles and other weapons. Although he may be beyond the range of ground-based weapons, he may be engaged by enemy aircraft. The aviator may still be able to fly at higher altitudes or use standard instrument flight procedures in this area, but should be transitioning to the lower flight altitudes of terrain flight or tactical instrument flight.

As the aviator continues to move forward toward the FEBA, he will come within the *effective range of the air defense weapons*. At this point, he must always remain low enough to avoid acquisition by the *early warning and tracking radar*. In doing so, he must reduce the flight altitude to a level below the enemy threat, yet high enough to provide a safe clearance of terrain obstacles. Naturally, as the aviator flies toward the FEBA, the capability of enemy radar to acquire him will continue to increase. The aviator must continue to adjust his altitude and flight route accordingly to remain below this threat or to be masked by the terrain.

In the forward areas though, due to the threat, it is highly unlikely that standard instrument rules and procedures will prevail. Consequently, different techniques will be necessary to operate in the forward areas under IMC. To enhance the all-weather capability of Army aviation, the concept of tactical instrument flight is proposed as an option to operating when the mission is essential and weather conditions are not cooperative.

Tactical instrument flight is defined as *flight under instrument meteorological conditions in an area directly affected by the threat*. It is used as a means to complete assigned missions when ceiling or visibility conditions preclude visual flight.

*Terrain
and
tactical
instrument
flying.*



*Tactical instrument flight
extends aviation operations.*

Tactical instrument flight provides the commander the capability to extend aviation operations against the enemy during periods of severely reduced visibility. Using tactical instrument flight, the commander can accomplish a mission under instrument meteorological conditions in a high threat environment that could not be accomplished using other flight techniques. It is also possible for the aviator to transition from conventional instrument flight in rear areas to low altitude operations in forward areas where enemy electronic warfare (EW) capabilities and weapons threaten. A combination of terrain flight and tactical instrument flight will enable aerial scouts to provide reconnaissance and early warning; attack helicopters to provide firepower; and utility and cargo helicopter operations to continue even under extremely low-visibility conditions.

Tactical instrument flight can be successfully accomplished through diligent and thorough training of aircrews and air traffic control personnel. Through testing, training, and practice, the capability can become a reality. Tactical instrument flight training not only should familiarize aviators with the principles and employment of tactical instrument flight in the high threat environment, it must also teach them to execute an instrument flight and approach into a landing zone using minimum electronic communication and navigation devices with the knowledge that such a flight can be accomplished safely. Unit training must be oriented toward accomplishment of the unit's mission under adverse weather and threat conditions with a minimum of assistance from electronic communication and navigation devices.

*Aircrews and ATC personnel
need to train together.*

Air traffic control personnel, as well as aircrews, also must be integrated into the training. Units must incorporate tactical instrument functions into their everyday missions. Flying at lower altitudes, minimal dependence on available navigation and communications equipment, detailed premission planning, and post-mission debriefing are training practices that can be used on a routine basis during normal operations. Training must emphasize flexibility in order for aviation elements to be able to respond quickly and reliably in a wide range of adverse weather situations.

It should be reaffirmed that tactical instrument flight is not just applicable to single aircraft. However, in the case of multiple aircraft operations, certain points should be stressed.

If either marginal VMC or IMC is forecast, position radio communications should be established and maintained with all helicopters in the team/flight. Secondly, all turns and climbs should be accomplished at a predetermined standard rate.

Another thing to keep in mind is that just because IMC is encountered does not imply you will lose total visual contact with the other members of the team/flight. When IMC permits the helicopters in a formation or team to maintain visual contact with each other, one of the following procedures may be used:

● The formation or team leader may decide to continue and complete the mission, provided each member of the formation is instrument/tactical instrument qualified.

1

● The formation leader may elect to perform a 180-degree formation turn out of the IMC.

2

● If the formation or team leader elects to continue the flight, he must insure that the intended point of landing is capable of accepting a formation landing under tactical conditions. Due to obstacle obstructions, sharp turns, etc., some approaches may not be deemed appropriate for the aircraft to complete in formation. In this case, the option may be to proceed single ship even though visual contact can be maintained. Then procedures would be basically the same as discussed in the next paragraph.

3

**IMC
PROCEDURES**
**VISUAL
CONTACT**

When IMC which instantly destroys all visual contact between the helicopters in the team/flight is entered, these general guidelines should be followed:

IMC GUIDELINES

NO VISUAL CONTACT

1

- Initiate breakup procedures as described on page 59 or per unit SOPs.

2

- Reschedule the mission so as to proceed under IMC. Plan an adequate time/distance separation for aircraft in the formation/team that will preclude overlap at the destination. Here, careful consideration should be given to the type instrument landing available at the facility. Some tactical instrument approaches are time-consuming. Therefore, more time than usual may be desired to give adequate separation between aircraft.

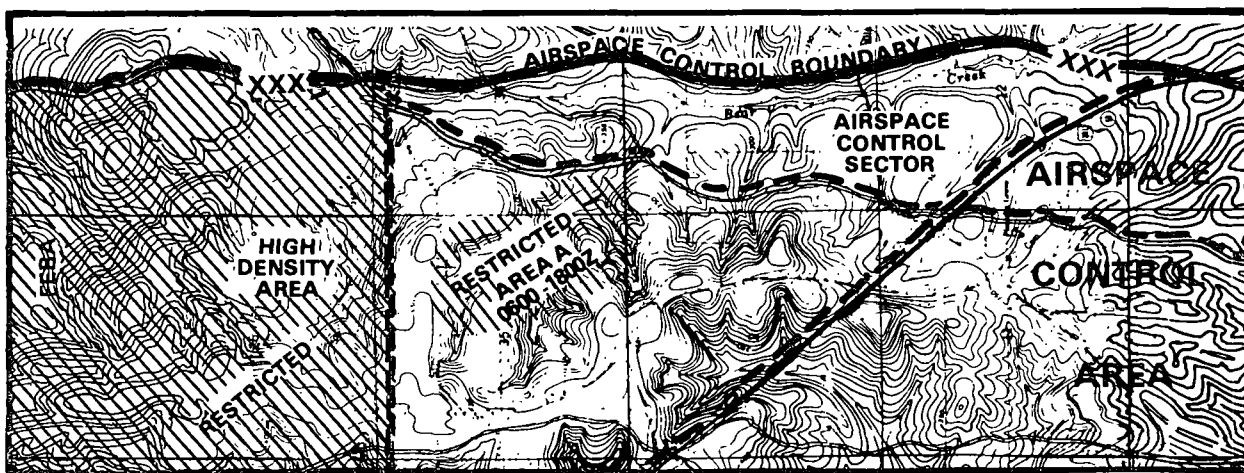
Of course, you—as an aviator—don't have to use these methods. Some pilots may be slightly hesitant to fly on instruments at terrain flight altitudes. There are other options you can choose. One could be to land and wait the weather out. Next, you could just fly along as long as your visibility and fuel hold out. Last—but not least—is to climb up to altitude and try to get picked up by air defense radar or USAF surveillance radar and proceed on vectors to an airfield for an instrument approach.

Our point is that “tactical instrument flight is an option.” Its use will depend on the air defense artillery (ADA) threat and mission requirements. In the final analysis, the option you select may be a combination of all methods and will be one you feel the most comfortable with.

army air traffic operations

The procedures employed in performing air traffic identification and control functions will vary from the surveillance and advisory-only aspects of a monitoring service to one of positive air traffic separation provided under the concept of positive control. Recognizing that positive control of all traffic in an area of operations is not possible, the objective of the airspace control system is to provide (as a minimum) flight-following service to all flights conducted in instrument conditions and to those flights conducted in visual flight conditions that will cross an airspace control boundary either inbound or outbound. Flight-following is a service provided by an ATC facility in which the enroute progress and/or flight termination of an aircraft is determined by use of aircraft position reporting procedures. The service includes relaying to aircraft, when requested, information affecting a flight such as weather conditions and warnings to aircraft. An airspace control boundary defines the lateral limits of an airspace control area, airspace control sector, airspace restriction, or high density airspace control zone. (See FM 100-42 for additional information about a high density airspace control zone.)

AIR TRAFFIC REGULATIONS



Aircraft movement within an area of operations may be conducted in instrument or visual meteorological conditions. The joint force commander, based on recommendations from Service component commanders, will establish the criteria by which aircraft will operate under instrument or visual flight

IMC/VMC CRITERIA

rules, depending on mission requirements and system capability. Division assigned/attached aircraft operating under VFR within the division area *normally will not be required to file flight plans*. When air operations are conducted in VMC, responsibility for air traffic separation is vested in the aircrews. Monitoring service and/or navigational assistance should be obtained from an appropriate air traffic control facility, when available.

AIR TRAFFIC OPERATIONS IN IMC

■ Flights into instrument flight conditions require clearance. All air traffic operating in IMC will be provided air traffic control service and, to the maximum extent feasible, positive radar control. Positive separation of traffic is dependent on knowledge in the airspace management center of all movements operating under like conditions; therefore, *clearance for all instrument flights will be issued by the airspace management center*. Coordinated tactical clearance procedures (fragmentary orders, etc.) normally will be used, and separation of aircraft will be effected through air traffic control facilities designated by the airspace management center.

■ When instrument meteorological conditions prevail and tactical operations of an emergency nature must be conducted on an immediate basis, the air traffic control capabilities of terminal radar facilities may be used, when available, to provide traffic separation until such time as control may be coordinated with and assumed by another airspace control facility. The airspace management center will be notified of such operations by the most expeditious means available.

■ Helicopters are exempt from filing flight plans when flying fragmentary operation orders missions, scrambled for an immediate support mission, or when assigned an emergency support mission. In these cases, the following clearance procedures apply:

- A fragmentary order is considered a flight plan, and clearance will be provided.
- The authority ordering a scramble will notify the appropriate air traffic control element.
- If a mission is ordered from a location where an air traffic control facility is not available, the pilot will contact an appropriate air traffic control facility as soon as practical after becoming airborne.

■ The inadvertent IMC procedures discussed below are suitable if an aviator loses visual reference with the ground or if visibility is too poor to locate obstacles and hazards. When the visibility conditions reach the point where the crew cannot navigate and the threat makes it impossible to climb to a high enough altitude to use tactical instrument flying, the best course of action may be to land prior to being forced to use the procedures discussed below. Visual reference with the ground can be lost on clear days as well as during adverse weather in dusty areas or areas of loose snow.

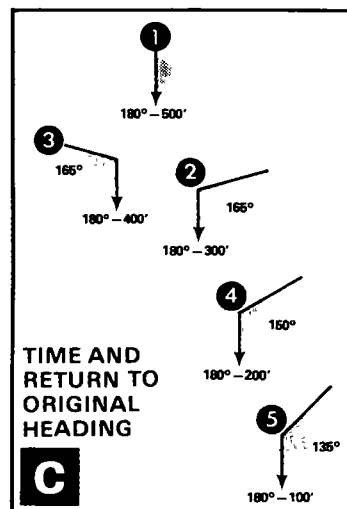
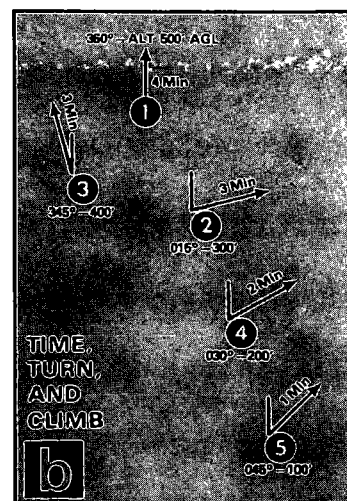
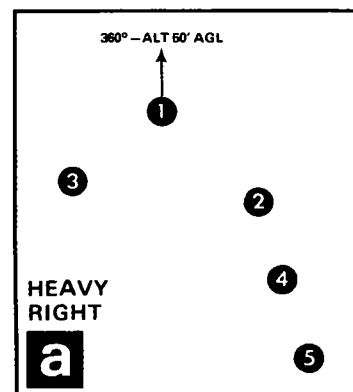
If visual reference with the ground (in weather) is lost, the most appropriate procedure for a single aircraft over level terrain might be to establish a climb and execute a 180-degree turn. This presumes the aircraft will not climb into the "kill zone" of enemy air defense weapons and that the terrain along the turn radius is free of obstacles. When the aviator is unsure of the conditions to his left or right or cannot return to visual meteorological conditions using a 180-degree turn due to terrain or obstructions, he should begin an immediate climb to an altitude at least 100 feet above the highest obstacle within 2,000 meters of either side of his course. Upon reaching a safe altitude, he should initiate a 180-degree turn and return to VMC or initiate calls for appropriate assistance.

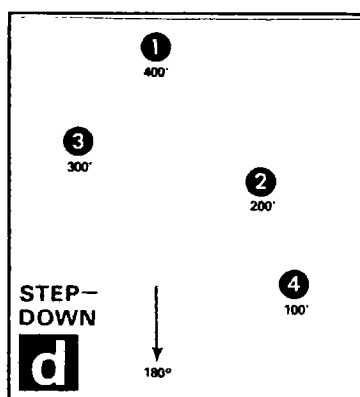
The inadvertent IMC procedures for formation flying described in this paragraph may be appropriate should the aircraft involved be in the relative positions depicted on this page. For example, let's say the aircraft involved were using a heavy right formation (fig A). Per their unit SOP, the first aircraft to begin losing visual contact with the flight notified the lead aircraft. Lead, as a matter of policy, notified the remainder of the flight to prepare to initiate IFR break-up procedures.

The formation continued on its present heading with no attempt to reverse course until vertical separation could be achieved. After a few moments No. 3 aircraft notified lead that visual contact with lead had been lost. Immediately, lead called the flight to begin IFR break-up for the particular formation being flown.

At this point, the lead aircraft began a climb straight ahead. Noting the time, each following aircraft turned in accordance with the SOP (fig B). On initiating the turn, each aircraft increased power, as necessary, to establish a 500-foot-per-minute climb, maintaining cruise speed.

Inadvertent IMC procedures.





All aircraft in the flight proceeded to a predetermined altitude for level-off (fig B). In addition, each aircraft had a specific amount of time to fly, depending upon its position in the formation (fig B).

After 1 minute from the break-up command, lead instructed the flight to begin turning to a heading of 180 degrees, once they had flown the time designated for their slot (fig C).

After about 3 minutes, aircraft No. 5 broke out and informed lead that he was VMC and returning to their pick-up zone (PZ). (This action by No. 5 was outlined in their unit SOP.)

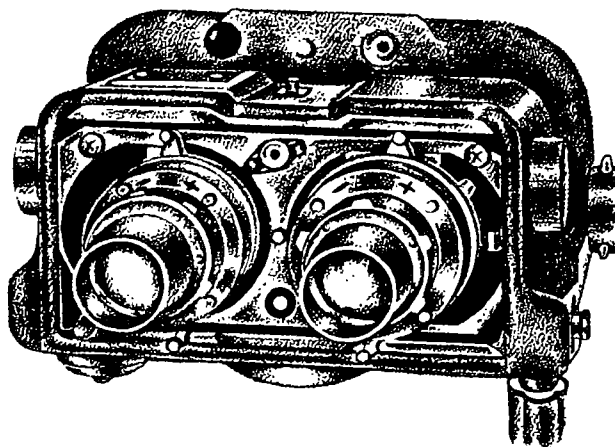
Upon lead's command all aircraft maintained cruise airspeed and decreased altitude by 100 feet (fig D). This process was repeated until all aircraft returned to VMC and joined up at the PZ.

This, of course, is a very simplified example. Each solution for this type of situation must take into consideration the type formation, terrain, manmade obstacles, the threat, mission, and the availability of navigational aids.

NIGHT OPERATIONS

Night vision goggles for aviators (AN/PVS-5).

The need for round-the-clock aircraft operations cannot be overemphasized. To forfeit half the day's fighting time because of darkness will be counterproductive to the battle effort. Night operations can be conducted virtually the same as daylight operations. Basic fundamentals of night flight are described in TC 1-28, *Rotary Wing Night Flight*. To further enhance pilot capabilities in night operations, use of the AN/PVS-5 night vision goggles is also discussed in TC 1-28.



■ Army air traffic control units provide continuous air traffic control service in the rear operations area. They also provide emergency and routine weather and air-warning information to aircraft in flight. The airspace management liaison section (AMLS) coordinates the integration of Army air traffic control unit facilities with other Service component air traffic control facilities. Integration of Army air traffic in to and out of the division areas is accomplished through the appropriate Army air traffic control unit. Thus, these units provide the interface for integrating and controlling Army air traffic in the rear operations area.

■ The Army air traffic control unit will establish an FOC and, when required, one or more FCCs in the rear operations area for the control of Army aircraft. FCCs organic to the Army air traffic control unit are established to extend the communication capabilities of the FOC. They normally serve as communication links between the FOC and the terminal facilities of Army airfields. The FOC and FCCs are located, as necessary, to provide coverage for aircraft operating in the rear operations area. Aircraft moving between the rear operations area and the tactical operations area will be handed over to or received from FCCs providing support to the tactical operations area. The FOC is collocated with—or electronically connected to—the Air Force control and reporting center (CRC). An FCC may assume the role of the FOC if the FOC is rendered inoperative or is displacing.

REAR OPERATIONS AREA PROCEDURES

In rear areas, Army ATC units can provide continuous service to aircraft.



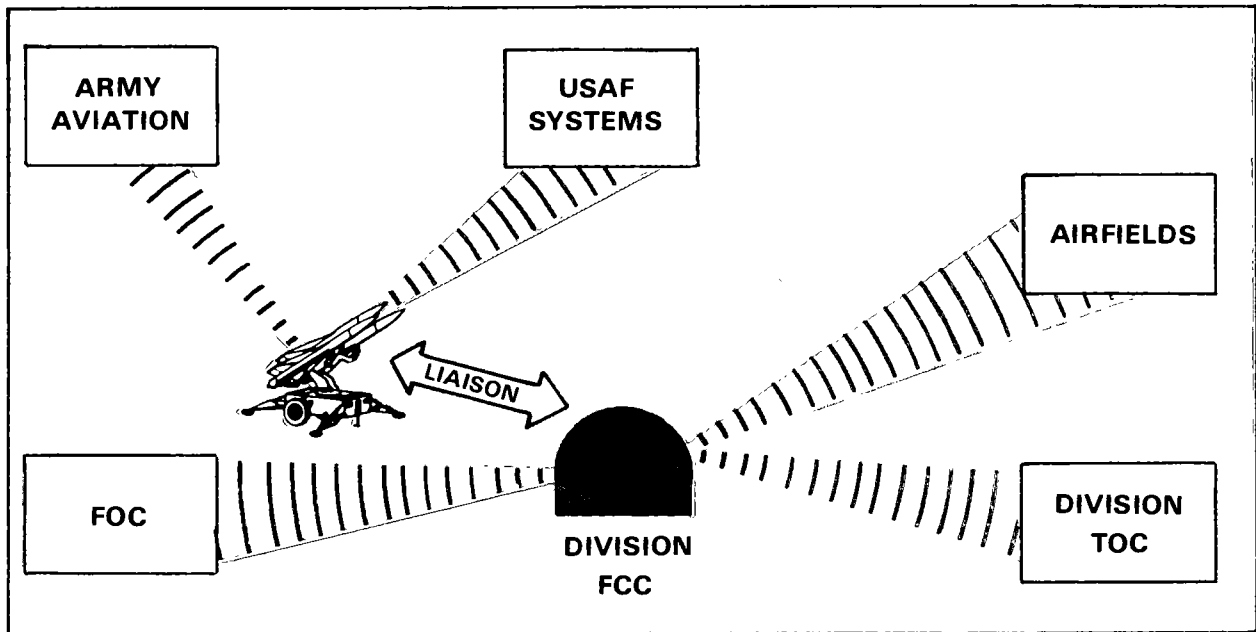
TACTICAL OPERATIONS AREA PROCEDURES

The tactical operations area as described in chapter 3 is that area where maximum flexibility of airspace users is needed to insure mission accomplishment. Restrictions and constraints will be kept to an absolute minimum and applied only when necessary. Freedom of movement by Army aircraft, based on mission requirements throughout this area, is necessary. The required flexibility and potential density of traffic make individual reporting neither feasible nor desirable. However, the coordination of information reflecting the intensity of weapons and aviation activity in the tactical operations area is an important airspace management function.

■ In addition to FCCs in the rear operations area, there normally will be at least one FCC designated to provide air traffic control service support for each division. The FCCs supporting division operations may or may not be located in the division areas. This division FCC serves as the primary airspace management facility for Army air traffic in the tactical operations area. It is usually located to permit optimum air-ground communications and to provide a communications link between the terminal facilities of the division airfields, other airfields located nearby, the division tactical operations center, and the flight operations center. The FCC will establish liaison with the direct support Hawk Army Air Defense Command Post (AADCP). The Hawk battalion radar, with real-time input from the associated fire units, can provide increased low altitude radar coverage over the division and forward of the forward edge of the battle area through voice and data links to the battalion AADCP. FCC liaison with the Hawk AADCP provides a link between Army air defense, Army aviation and Air Force systems through the Hawk battalion AADCP. However, the air defense mission will remain the first priority for the Hawk battalion should a conflict occur. The AADCP/FCC will provide certain airspace management service to aircraft operating in and forward of the division area on an as-required or emergency basis. The following are options that may be selected in siting the division FCC in relation to the supporting Hawk AADCP in order to maximize service to aircraft:

- Collocate an element of the FCC with the Hawk AADCP.

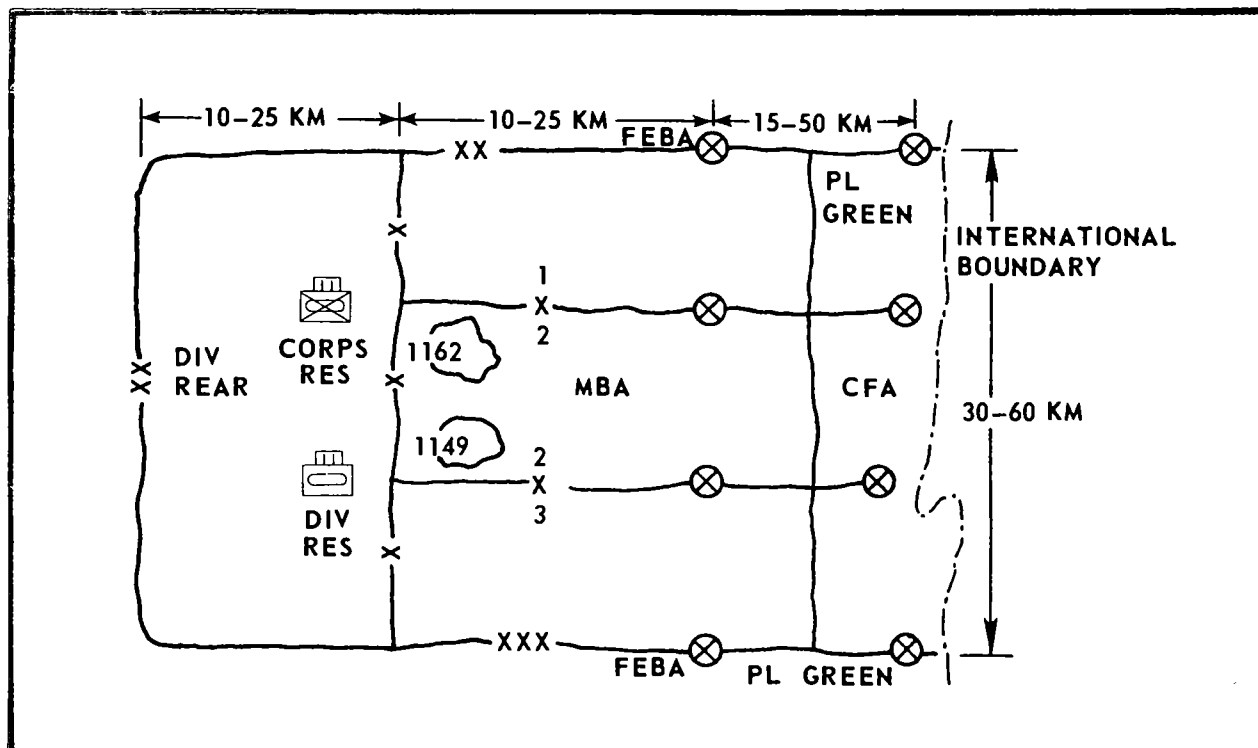
- Collocate the FCC with the Hawk AADCP.
- Electronically connect the FCC with the Hawk AADCP.



■ The division FCC is responsible for providing air traffic control service for Army aircraft within the division area and serves as a point of access into the airspace control system.

■ Employment of Army aviation in the brigade area may require terrain flying techniques under control of the brigade. Aviation unit operations will provide advance entry information briefings to include the supported unit's tactical situation to aircrews entering the brigade area. The supported unit (brigade/battalion) must be provided advance information on arrival time and place of entry of Army and other Service supporting aircraft entering the respective area to provide support. Army aircraft operating in the brigade and battalion areas are routinely controlled through the chain of command. The degree of control necessary to prevent interference will depend in large measure on the intensity of combat activity. Commanders communicate directly with Army aviators to accomplish tasking and to coordinate tactics and techniques.

tactical situations



Typical defense posture.

The following vignettes are examples of airspace management and air traffic control operations of units in a typical defense posture as depicted above. They are not intended to be "school solutions," but are more intended to bring together systems described in earlier chapters.

COVERING FORCE AREA (CFA)

Consider yourself with an assault support helicopter company participating in a resupply mission to a unit located in the CFA. We really need not be specific about the unit mission because the point here is to describe how the air traffic control system contributes to the mission accomplishment. Since Army aviation pays the highest dividends when tactical operations are fast-moving or changing, we want an air traffic control system that allows them to be just that—*fast-moving and responsive*. The system we shall depict is one that follows these basic principles.

- 1** Minimize controls and restrictions.
- 2** Issue requested inflight advisories.
- 3** Minimize communications and reporting requirements.

Now for a question always asked: "What about the aircraft belonging to other units in the CFA, and will there be controls insuring separation, location, identification, etc.?" The only Army aircraft working the airspace in the CFA will belong to the covering force or be OPCON to it. Remember, the airspace manager up there is the maneuver commander—the covering force commander.

He knows *who's supposed to be out there, where they are, and what they're doing*. His staff has taken particular care to make sure air and land briefings include all those items necessary to preclude any problems. Things such as:

ARTILLERY	TACTICAL AIR	NUCLEAR STRIKES	AIR DEFENSE
WEATHER	UNIT LOCATION (FRIENDLY AND ENEMY)	THREAT	AIR TRAFFIC

"OK, that sounds fairly realistic, but what about the Air Force?" Through mission briefings, the Air Force is kept abreast of the covering force mission. Additionally, information is passed back through any one of the various agencies described in chapter 2. Further, the airspace control authority (ACA) has established a coordinating altitude shown earlier on page 33.

As mentioned in chapter 3, coordinating altitudes designated by the ACA are to reduce conflict between rotary-wing and fixed-wing aircraft. Therefore, this measure should help eliminate the possibility of surprise meetings. However, “see-and-be-seen” during VMC will be the prevailing aid in avoiding conflict.

“So far so good, but are we going to need to talk to each other and give position reports? Is someone going to make us report checkpoints A, B, C,?”

Coordinating altitudes help eliminate surprise meetings.

First of all, radio traffic is going to have to be kept to an *absolute minimum*. To keep from giving away your location and what your mission is, the commander is most likely to have only a checkout and a check-in procedure. After that, it will be intra-flight communication only. That, too, should be reduced because casual banter on the radio between aircraft could give the threat a good fix on your flight.

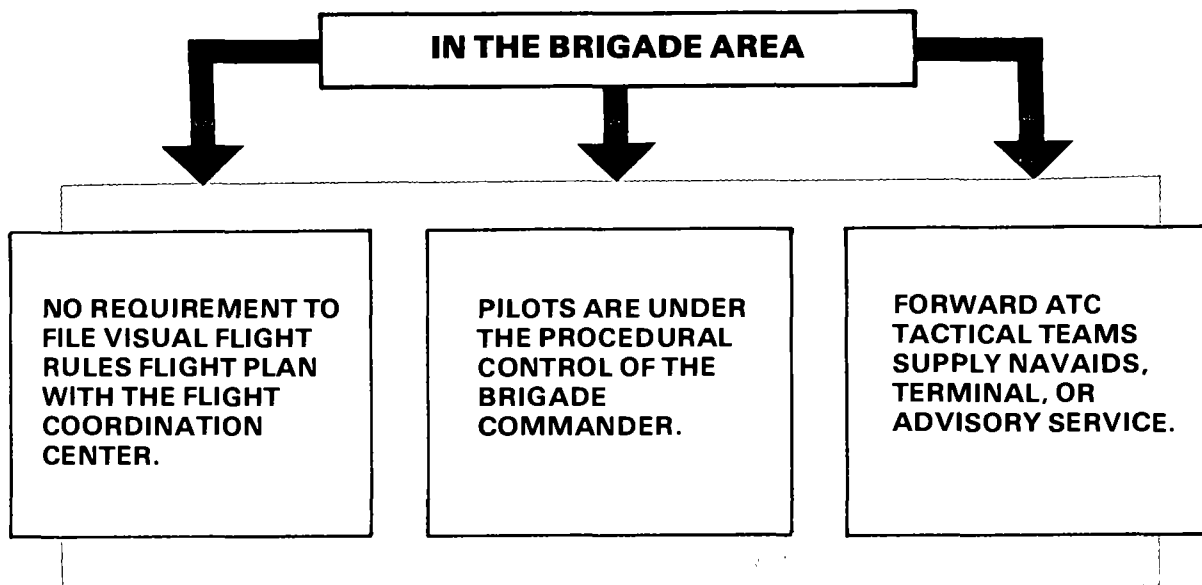
As far as communication between other flights is concerned—that too is doubtful. It would be nice to know their status but nap-of-the-earth (NOE) flight may negate the line-of-sight necessary for radio communication.

Conducting operations in this area is going to be a situation of “seeing and being seen” to prevent meshing rotor blades with an aircraft on another mission.

We could complicate this assault support helicopter unit’s mission by adding a little weather, IMC. What do we do now? Is this where the controls are going to appear? Well, if the mission briefing covered weather—and we expect it did—you should know what to expect and plan accordingly. However, inadvertent IMC is always a possibility—so what then? Inadvertent IMC procedures followed by tactical instrument flight perhaps? (See pages 51 and 59.)

Airspace management procedures in the main battle area (MBA) should not differ too dramatically from the CFA. Traffic will increase; but generally, it will be free-flowing and follow the parameters shown below.

MAIN BATTLE AREA (BN/BDE)



So what do we do now? We have the brigade commander of the maneuver units serving as the airspace manager. He will insure his airspace management personnel conform to the following guidelines.

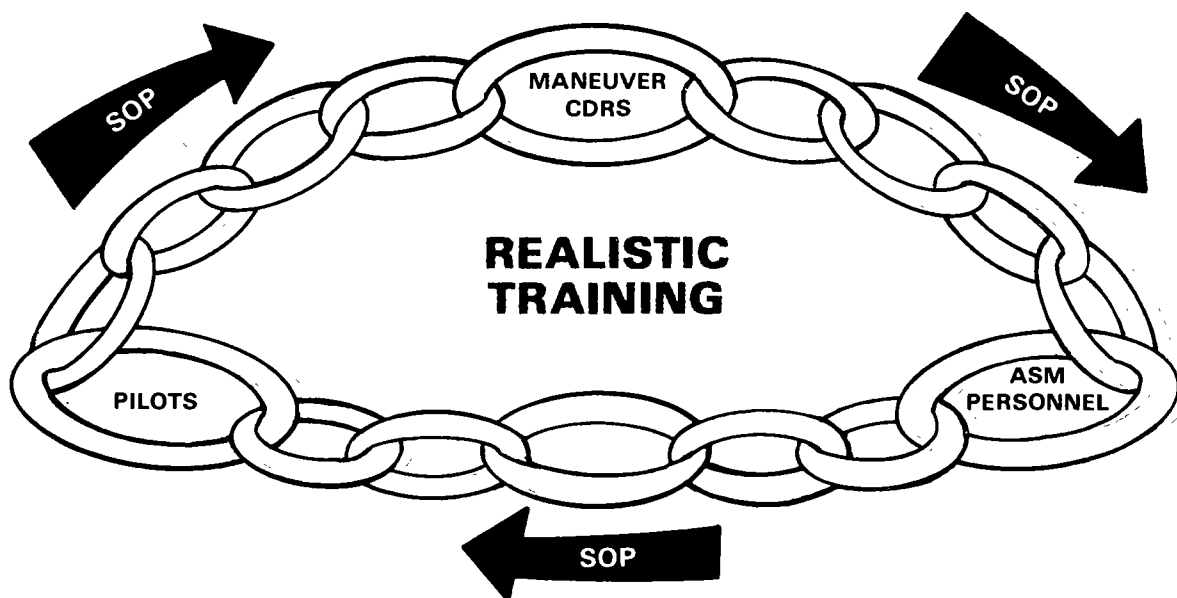
- Don't overcontrol
- Obtain and disseminate coordinating altitude information
- Establish flight routes
- Broadcast requested advisories — not routine

Additionally, he will charge his pilots with the mission of "see-and-be-seen" and they will keep his airspace management personnel and supported units advised of any inflight changes that would affect the mission or interfere with other missions.

*The mission is
"see and be seen."*

Finally, he will impress upon his subordinate maneuver commanders and their staffs the importance of comprehensive pilot briefings.

The concept of effective airspace management at the maneuver unit level is dependent on procedures that will work in a degraded command/control communications environment. The key has to be a coordinated effort of maneuver commanders, airspace management personnel, and pilots. Adherence to SOPs and realistic training will provide a smooth working organization.



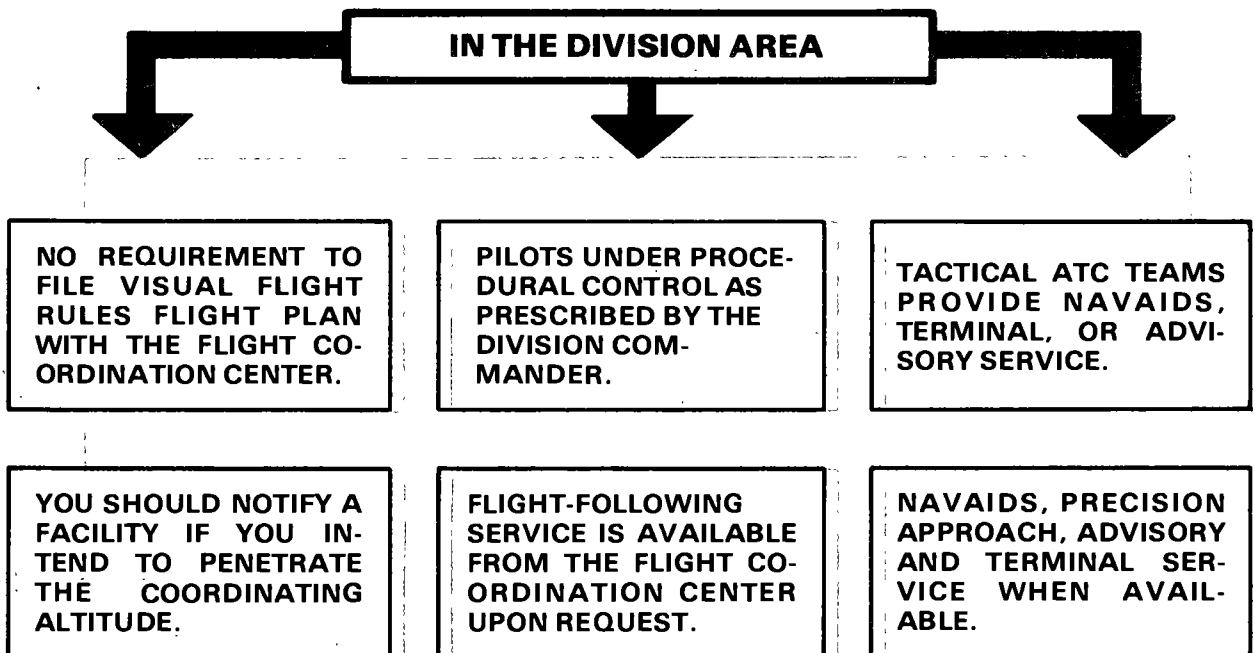
What about instrument flight rules (IFR) flight? Actually, the situation will improve slightly as we move away from the line of contact (LC). The threat will still be there but perhaps not as intense as in the CFA. The options remain roughly the same under instrument meteorological conditions in the MBA as existed in the CFA. Tactical instrument flight is the answer for aircraft operating under adverse weather conditions when the tactical situation requires the mission to be flown.

Planned instrument flights improve considerably the farther back you fly. This is not to say planned instrument flights from the CFA could not be accomplished. That couldn't be farther from the truth. However, the probability of such a planned flight increases the farther we fly to the rear area.

Consider an assault helicopter leaving the brigade heliport and returning to the division airfield for any number of reasons. IMC prevails at its location. The pilot may file a composite special VFR/IFR flight plan by landline communications prior to departure, or conditions may require him to file an instrument flight clearance while airborne. The pilot receives his clearance from the FCC and proceeds via his clearance route. As the aircraft proceeds to the rear, the division FCC may assign a higher flight altitude as threat conditions permit, thus increasing the safety margin for obstacle clearance. At an appropriate transition point, the division FCC will hand the assault helicopter over to the division airfield ground controlled approach (GCA) team, which is part of the ATC platoon supporting the division airfield; and the pilot will initiate a ground controlled approach. Simple enough? We like to think so.

In the division rear area, VFR flights continue under the basic guidelines and principles covered in the CFA and MBA. *Again, it's coordination and training that are going to make the difference.* Even though the division rear is going to have more air traffic, it need not be a complicated myriad of procedures. The type air traffic control visualized in the division rear is described below.

DIVISION REAR AREA

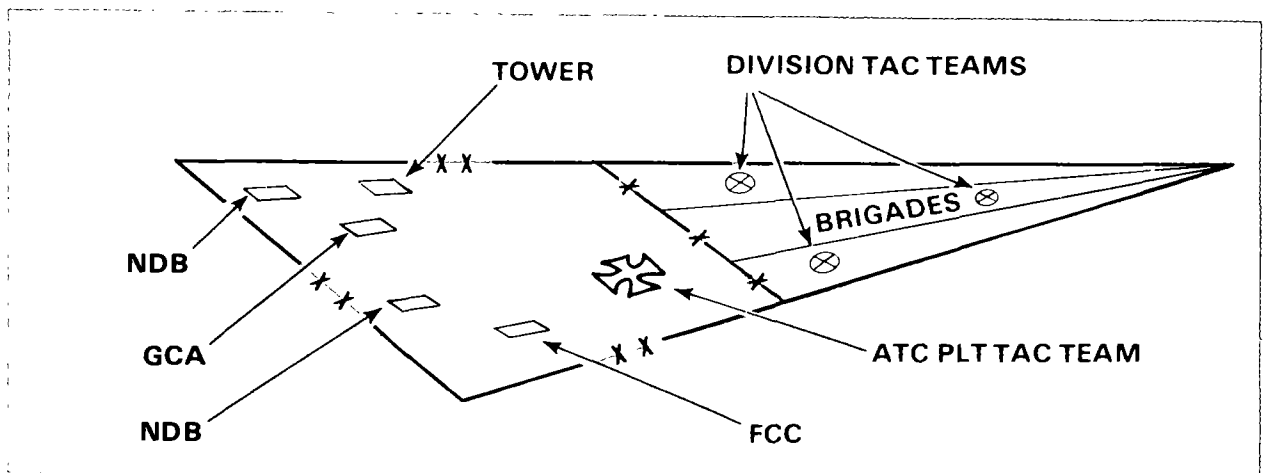


Under instrument conditions—either planned or inadvertent—the services *readily* available increase significantly.

The ATC company (forward) will have one of its platoons operating the division airfield. Within the platoon you have one each:

- Control Tower Team
- Tactical Team
- GCA Team
- Enroute FOC/FCC Team

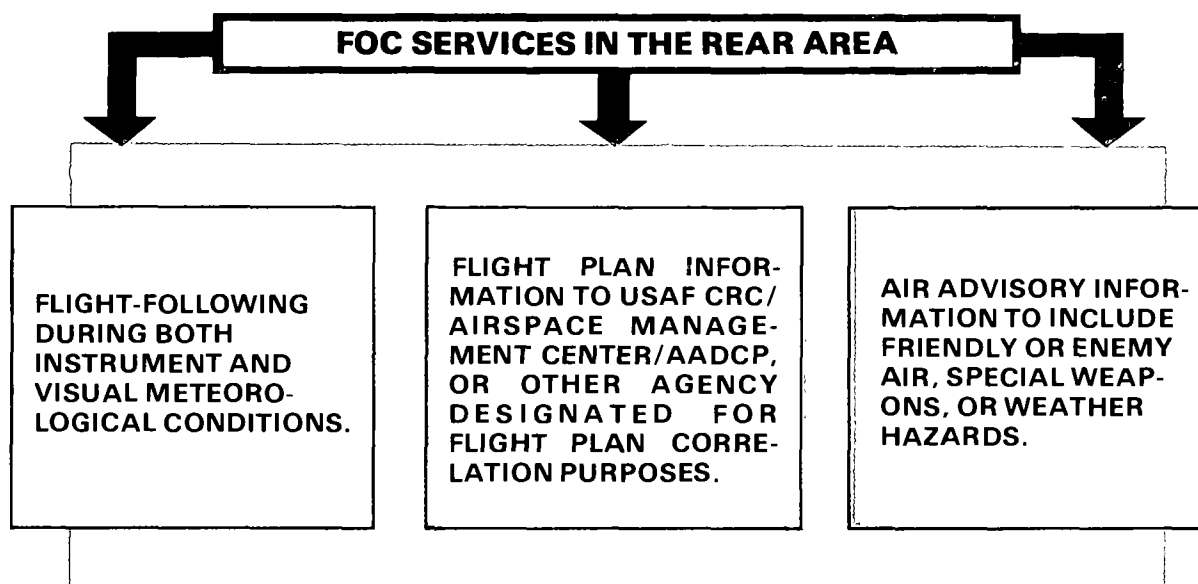
This platoon may be laid out in a configuration as pictured below. Location of elements is dependent on the threat. As a matter of sound air traffic control, they will be tied in to the division organic tac teams also shown.



To show the transition to corps, let's extend the flight of the assault helicopter going to the division airfield. Instead of stopping at the division airfield, it proceeds past the division rear boundary heading for one of the corps airfields provided by the ATC battalion supporting the corps. At an appropriate transition point, the division FCC will hand the assault helicopter over to the corps FOC/CRC which will monitor its progress by radar and continue to provide services for the flight to its final destination. It will then be handed over to the appropriate approach control for approach clearance.

Army air traffic in the corps rear area is serviced by the corps FOC operated by an air traffic control unit. This facility is collocated and in direct communication with the USAF CRC. When the FOC is physically separated from the CRC, the USAF will furnish communication for connecting the two facilities. The FOC will serve as the primary agency for control of Army air traffic and will provide the following services, when appropriate:

CORPS REAR AREA



In addition to operating the corps FOC, the corps ATC unit plans, coordinates, establishes, and operates those FCC facilities necessary to provide navigational assistance for Army aircraft throughout the entire corps area and down to the forward brigade areas.

The FOC receives enroute air traffic from, or hands over traffic to, adjacent FOCs and FCCs. Clearance for all instrument flights will be issued by the airspace management center. The FOC issues weather reports on the basis of information provided by the corps weather teams. Constant communication must be maintained between the FCC and the Army Air Defense Command Post for coordination purposes. Although collocation of these facilities will assist in communications, it also provides a lucrative target for enemy attack—a fact that should always be considered.

Corps FCCs will be established, as necessary, to extend the communications of the FOC. An FCC will assume the role of the FOC if the FOC is rendered inoperative or is being moved. A corps FCC routinely will be assigned as the alternate FOC. Corps FOC/FCC equipment consists of an AN/TSC-61A flight coordination central, shown in appendix C. Corps FCCs, whether operating in the corps area or in the division area, perform essentially the same function, only at different echelons, and are provided with the same equipment.

It would be nice to say that flight in the corps rear would be as unrestricted as it is in the CFA or MBA. Remember, the airspace does not belong to one Service, so we must abide by stated procedures. But are these procedures all that tough to comply with under VMC? No! Will flights at terrain flight altitudes be permitted? Sure they will. All that's asked is to stay in contact with our own FOCs and FCCs provided by the ATC group. What could be simpler? They will provide the necessary guidance and services to get us on our way, out of other traffic's way, and to conform with established procedures. From time to time—still keeping "the threat" in mind—you may have to come up to altitude to maintain communications, but that's not complicated. Additionally, you still have that coordinating altitude which allows you to climb somewhat without running into another aircraft.

The airspace does not belong to one Service, so we must abide by stated procedures.

Instrument flight in the corps rear area may become similar to stateside instrument procedures; however, these procedures will not be any more difficult to adjust to than those imposed by the FAA in the United States.

To illustrate this concept a flight is described below. The altitude in this description is used purely for sake of illustration. *Current threat information should be consulted before any actual safe altitudes are established.*

The following represents the progression of a helicopter flight from the corps support command (COSCOM) to a field location of a forward brigade.

After a flight plan is filed and an air traffic control IFR clearance is received, the helicopter takes off and communications are initiated with the FOC/CRC. Aircraft location and identification will be confirmed by radar and interrogator. The helicopter proceeds via the clearance route, using nondirectional beacons and other NAVAIDs, and is monitored by radar. Although the clearance altitude will be provided to the pilot in mean sea level (MSL), obstacle clearance above ground level (AGL) is a primary concern to the aviator. By preplanning flight routes early, the interpolation of MSL flight information to AGL use is easily accomplished. As the helicopter approaches the division rear boundary, a predetermined transition point may be established at which the helicopter may be transitioned down to a lower altitude, then handed over to the division FCC for further routing to the approach control facility serving the division main heliport or other intended destination.

The division controller may assist the helicopter to execute a tactical instrument approach at his destination. Or, if weather and terrain conditions permit, he may provide a ground controlled approach monitored descent to visual flight conditions which allows the helicopter to proceed visually to the forward brigade location using terrain flying techniques. The radar-monitored descent may be flown away from the FEBA as a deceptive measure so as not to indicate the flight's destination point to the enemy. Additionally, this procedure will eliminate unnecessary telltale approaches to the division main area and will lessen the enemy's ability to fix it or to determine the helicopter's true destination.

Obstacle clearance above ground level is a primary concern to the aviator.

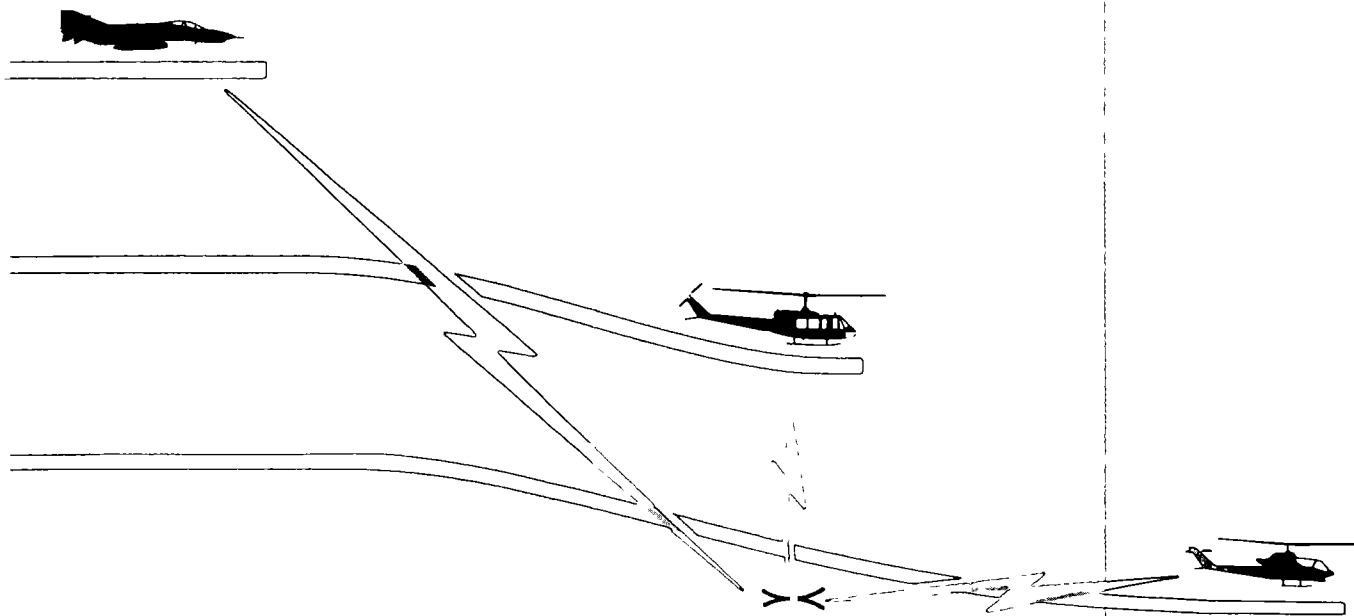
Since forward area units normally will displace and relocate navigation and letdown facilities frequently, aviators not intimately familiar with the local situation will often find it necessary to land at a facility in the division rear areas to obtain information on the tactical situation, the threat, flight routes, and tactical instrument flight procedures into the forward brigade area.

IN SUMMARY

- | | |
|----------|---|
| a | THE DEGREE OF AIR TRAFFIC CONTROL IN THE TACTICAL OPERATIONS AREA (DIVISION/BRIGADE AREA) IS DETERMINED BY THE COMMANDERS, AND BASED UPON THE TACTICAL SITUATION. |
| b | ARMY AVIATION OPERATIONS IN THE TACTICAL OPERATIONS AREA NORMALLY ARE CONDUCTED IN A PROCEDURAL CONTROL ENVIRONMENT. |
| c | ARMY ATC UNITS CAN PROVIDE FLIGHT-FOLLOWING SERVICE, NAVAIDS, PRECISION APPROACH RADAR, ADVISORY, AND TERMINAL SERVICE. |
| d | THE CORPS FOC IS THE PRIMARY INTERFACE WITH THE USAF SYSTEM ON MATTERS CONCERNING THE COORDINATION OF ARMY AVIATION ACTIVITIES. |
| e | THE FCC COORDINATES EMERGENCY RADAR SERVICE FOR ARMY AIRCRAFT IN THE DIVISION AREA WITH AIR DEFENSE AND USAF. |



stability operations



army air traffic support requirements

Air traffic elements must provide continuous support during displacements.

Army air traffic activities in a stability operation are directly dependent upon the extent to which Army forces, particularly Army aviation forces, are committed to each operation. Although only the minimum air traffic elements required for mission accomplishment should be used, they must be sufficient to provide continuous support during the frequent displacements that are necessary in stability operations. Also, in determining air traffic support requirements, consideration should be given to the physical configuration of the theater of operations which can differ more greatly from, and cause a greater requirement for, facilities than that encountered in more conventional operations.

allied force operations

The combined force commander establishes the allocation for airspace authority.

Where US Forces operate as part of a combined force containing military elements of Allied Nations, the combined force commander will establish the basis for allocation of airspace authority to elements of the combined force. For those areas in which airspace management is conducted by participating Army forces, air traffic services will be provided by Army elements as discussed in chapters 2, 3 and 5.

host country considerations

GENERAL—

Airspace over a host country remains under host country control.

When US Forces are participants in military operations conducted in a host country, policies for the use of airspace by US forces normally are developed through agreements between the US Joint Force Commander and representatives of the host country government. These agreements may specify that all airspace over the host country will remain under control of the host country government, with operational control of certain airspace being delegated to the authority of the US Joint Force Commander. The host country may delegate other airspace areas to the authority of host country civil and military organizations, together with responsibility for providing air traffic services for their areas. Thus, since several different organizations may become involved in air traffic activities, it is necessary that the facility established in each area be compatible with each of the other facilities operating in the host country.

HOST COUNTRY AVIATION—

Host country civil and military aircraft flights in areas not delegated to US or other authority are conducted in accordance with air traffic procedures established by the host country organization concerned. Flights by these aircraft into airspace delegated to US military authority are regulated by air traffic procedures established for each area by the Service concerned in accordance with guidance from the joint force commander through the airspace control authority.

SECURITY—

Military aircraft operations habitually are oriented toward the use of security measures such as the controlled use of radios and lights. Civil aviation operations may be less oriented toward the use of such security measures. This could result in acquisition by the enemy of information for use in countering civil aviation operations, or for use against military installations and operations in the same or nearby areas. Adequate procedures must be established to insure that all military and civilian aircraft operating in the airspace that has been delegated to the responsibility of the joint force or component force commander will comply with existing security measures.

Civilian and military aircraft must comply with security measures.

army air traffic procedures

Army air traffic procedures used in stability operations are those procedures established for conventional tactical operations, adjusted to meet the requirement of the environment in which the operations are being conducted. Regardless of the adjustments necessitated by the tactical environments, the Army air traffic system will be based upon the general principles established in preceding chapters of this manual.

Since the procedures used by the FOC and FCC in controlling aircraft traffic generally are the same as those used in more conventional operations, elements of existing Army air traffic control units usually are adequate to establish and operate a system for stability operations. Elements of the ATC unit may establish airways for use by air traffic between tactical areas of responsibility. These airways will be controlled by ATC elements (FOC, FCC) supporting the force occupying each area.

FOC and FCC procedures remain the same for stability operations.

Flight-following service can be used to enhance search and rescue operations.

For aircraft operating in areas adjoining a tactical area of responsibility, the responsible air traffic facility may provide a flight-following service. The primary function of this service is to provide a record of the general area in which specific aircraft are operating and the time at which voice radio reports are to be made to the facility for use as a basis for alerting search and rescue elements, when necessary. Also, the air traffic element uses knowledge that these flights are being conducted to provide information to aircrews regarding friendly or enemy operations which may affect the flights.

other considerations

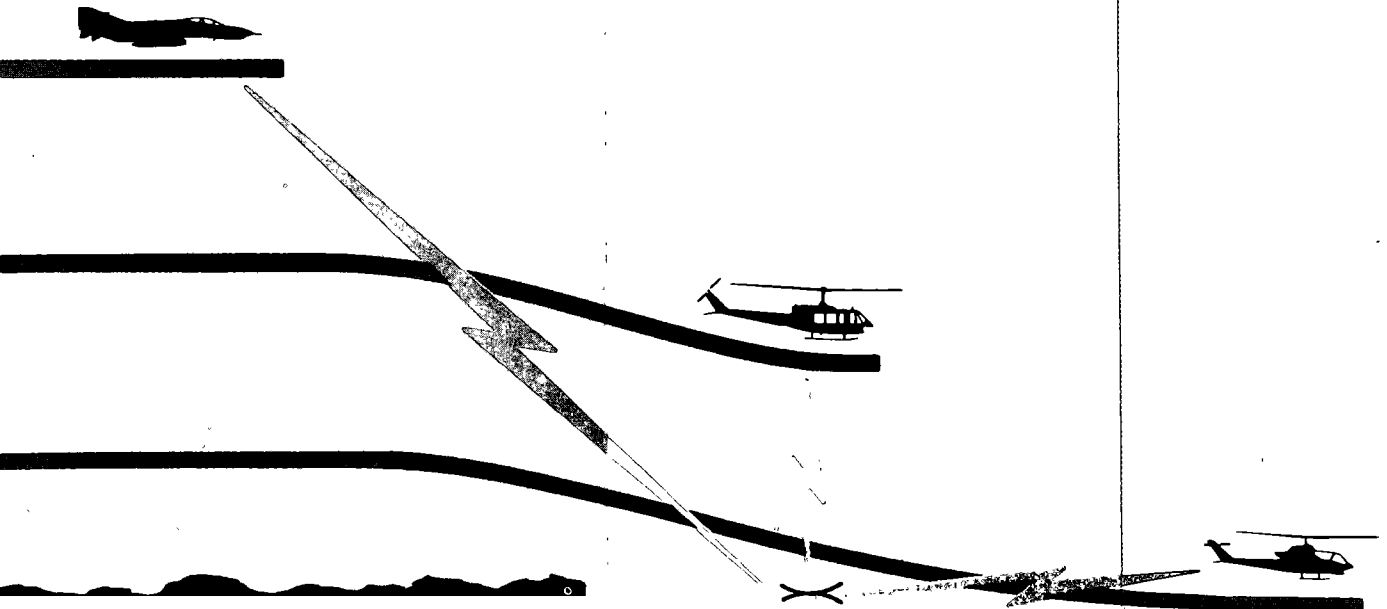
Army aircraft can provide freedom of movement when poor roads and rugged terrain exist.

The poor road networks and rugged terrain often associated with stability operations increase the requirement for Army aviation support of land combat forces. Where land forces are located in scattered positions throughout the combat zone, freedom of movement of Army aircraft transporting troops and materiel between these points must be maintained.

Special airways may be required to aid resupply missions.

Stability operations normally are characterized by a reduced air threat. This permits other Service aircraft, which normally would be used to counter the enemy air threat, to be used to increase the close air support capability. The increased close air support capability, scattered areas of troop disposition, and increased requirement for surface-to-surface fire support necessitate the close coordination of all fire support activities of the participating Services. Accordingly, elements of the TOC may be required to broaden their functions and become more involved in the minute-by-minute coordination which is essential to this type of operation. Where road networks are inadequate or not under the control of friendly forces, there will be increased dependence on aircraft for delivery of supplies and equipment. This may require the establishment of special airways for the exclusive use of these aircraft.

appendices



appendix a

references

ARMY REGULATIONS (AR)

- | | |
|-----------|---|
| 95-series | - <i>Army Aviation</i> |
| 310-25 | - <i>Dictionary of US Army Terms</i> |
| 310-50 | - <i>Authorized Abbreviations and Brevity Codes</i> |

FIELD MANUALS (FM)

- | | |
|--|--|
| FM 1-1 — — — — —
<i>Terrain
Flying</i> | - An unclassified manual which provides the <i>why</i> and <i>how</i> of the three types of terrain flight. The primary purpose of the manual is to provide guidance to assist the aviation unit commander in establishing training programs which progress from individual nap-of-the-earth (NOE) qualification through advanced unit training. FM 1-1 discusses the training required to prepare the individual aviator and the tactical aviation unit to operate using terrain flight as an aid to survivability and mission success. |
| FM 1-5 — — — — —
<i>Instrument Flying
and Navigation for
Army Aviators</i> | - This manual provides the fundamentals, procedures, and techniques for attitude instrument flying and air navigation. Chapter 22 introduces approved tactical instrument flight and navigation procedures for aviation units operating in a combat environment. Tactical instrument flight represents a field expedient instrument airway to be used for the purpose of operations under adverse weather conditions on the high threat battlefield. |
| FM 90-1 — — — — —
<i>Employment of
Army Aviation
Units in a High
Threat Environment</i> | - This is an unclassified field manual written to describe to the maneuver commander how to employ aviation units against the threat on the modern battlefield. It is designed to provide a broad doctrinal foundation for future publications which will be specifically oriented toward the employment of type aviation units operating as broad proponent elements. Because Army aviation units are members of the combined arms team, combined employment is stressed throughout this manual. Total integration of the ground and aerial capabilities is provided to commanders for a wide variety of tactical alternatives. |

- FM 100-5 = = = = = This manual sets forth the basic concepts of US Army doctrine. Those concepts form the foundation for what is taught in service schools and the guide for training and combat developments throughout the Army. FM 100-5 presents principles for accomplishing the Army's primary mission—winning of the land battle. It is the capstone manual of the Army's system of field manuals and covers the relationships among operations. This manual is intended for use by commanders and trainers at all echelons.
- Operations*
- FM 100-28 = = = = = The purpose of this publication is to prescribe doctrine and procedures governing the activities of the Armed Forces of the US engaged in planning for and conducting airspace control in the combat zone. The doctrine and procedures set forth in FM 100-28 are not intended to delimit the authority and responsibility of commanders over their organic resources but rather to enhance joint operations.
- Doctrine and
Procedures for
Airspace
Control in the
Combat Zone*
- FM 100-42 = = = = = This manual fulfills the requirement for joint operational doctrine and procedures developed in accordance with responsibilities assigned by Departments of the Army and the Air Force. The procedures set forth in this manual are designed as guidance for Army and Air Force forces engaged in planning for and conducting contingency and combat operations.
- US Air Force/
US Army Airspace
Management in an
Area of Operations*
- FM 101-5 (DRAFT) = = = = This manual describes a command and control system which is deceptively simple. It places the major burden on the unit commander and provides him with only a relatively small staff to assist him. It does not describe how the commander will organize and function in specific detail. It speaks rather of mission-type orders and face-to-face communication between commanders.
- Command and
Control of Combat
Operations*
- FM 1-51 = = = = = This manual covers the fundamental rotary-wing flight techniques applicable to initial entry rotary-wing aviators, flight and academic instructors, rated aviators, and aviation unit commanders.
- Rotary Wing
Flight*
- FM 1-200 = = = = = This manual provides administrative and operational standards for the operation of US Army air traffic control facilities. It is supplemental to Federal Aviation Administration (FAA) Handbook 7110.65 which prescribes the separation minimum and procedures to be used in providing air traffic control services.
- Air Traffic Control
Facility Operations*

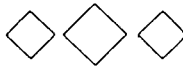
FM 44-1 — — — — — The purpose of this manual is to describe the fundamental principles of air defense artillery operations, organization, and tactics.
US Army Air
Defense Artillery
Employment

TRAINING CIRCULARS (TC)

TC 1-28 — — — — — This publication provides the basic fundamental principles required for night transition and related subject material of which the aviator must have knowledge in order to effectively develop his night flying skills. It explains the techniques and procedures of night rotary-wing flight in sufficient detail to train an aviator to conduct night, low-level, contour, and nap-of-the-earth flight.
Rotary Wing
Night Flight

STANDARDIZATION AGREEMENTS (STANAG)

STANAG 3805 — — — — — The purpose of this publication is to provide the NATO forces with guidance on the preparation of procedures for airspace control in the combat zone. In addition, it standardizes the terminology, means, and basic procedures to be used when preparing airspace control procedures.
(DRAFT)
Doctrine and Pro-
cedures for Air-
space Control in
the Combat Zone



appendix b

concept for air traffic control organizations

NOTE: At the time FM 1-60 was written, the ATC group series TOEs had not yet received final approval from Department of the Army (DA). Therefore, some of the data used in this appendix may differ slightly from the actual TOE. To insure accuracy as to the personnel, equipment, and capabilities of these organizations, refer to the DA-approved TOE.

atc group

The ATC group's mission is to provide staff administration, operational and logistical planning and support for Army air traffic control within a theater of operations. In addition, the group headquarters provides command supervision of assigned or attached air traffic control units.

The group is assigned to a theater Army communications command or to a major task force as required. Elements of the group normally are placed in direct support of the commands and aviation units to which they provide ATC support.

■ Type units normally assigned to the ATC group include—

- ATC company (COMMZ) - (TOE 1-223)
- ATC battalion (corps) - (TOE 1-225)
- ATC company (forward) - (TOE 1-227)

■ Provides assigned or attached ATC units with personnel and equipment to operate and maintain—

MISSION

ASSIGNMENT AND EMPLOYMENT

CAPABILITIES

- Division and corps instrumented airfields/heliports as determined by the DAME/CAME.
- Communication zone instrumented Army airfields as required.
- Tactical helipads/landing zones as required.

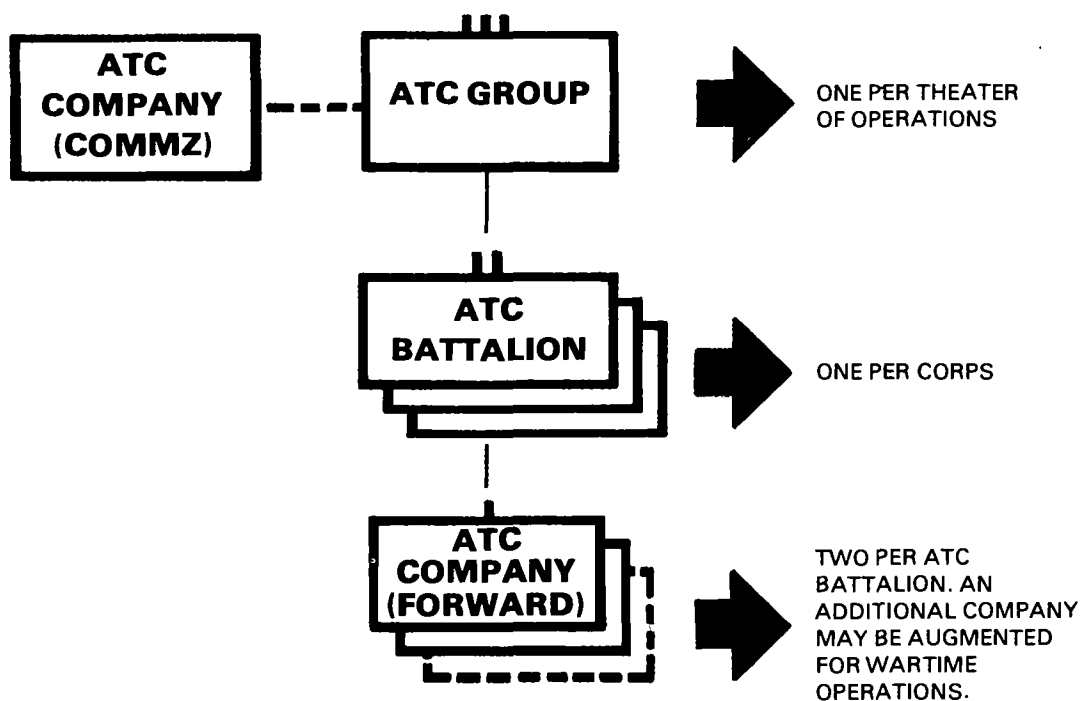
■ Provides an enroute air traffic control system of flight operations centers (FOC) and flight coordination centers (FCC) as determined by the DAME/CAME.

■ Navigational beacons for use at airfields and/or heliports and enroute air traffic control.

■ ATC liaison personnel to Air Force and Army elements.

■ Personnel and equipment to inspect and evaluate ATC facilities and operations.

AIR TRAFFIC CONTROL GROUP BASIS OF ALLOCATION



atc company (commz)

The ATC company (COMMZ) has the mission to provide terminal air traffic control, navigational aids, air warnings and other assistance to inflight aircraft.

MISSION

The ATC company (COMMZ) is normally assigned to the ATC group. It is normally employed with its platoons placed in direct support of aviation units operating airfields/heliports in the communication zone requiring ATC instrumentation services. Platoons of the company operate from dispersed locations within an assigned area and normally are collocated with supported aviation units for security and to enhance responsiveness.

ASSIGNMENT AND EMPLOYMENT

- Provides terminal ATC services to include tower, approach control, ground control approach radar, and terminal navigational aids at up to four Army airfields and/or heliports.

CAPABILITIES

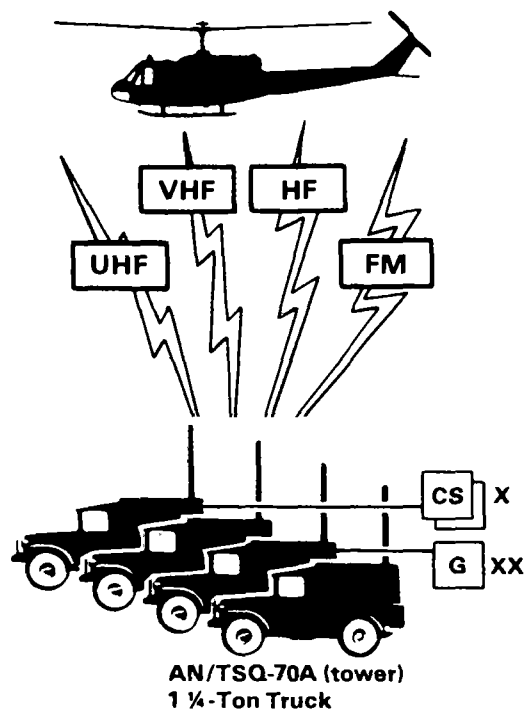
- Provides liaison and coordination with airspace management elements as directed.

- Platoon-sized elements and individual teams may be added or deployed independently to meet particular air traffic control requirements.

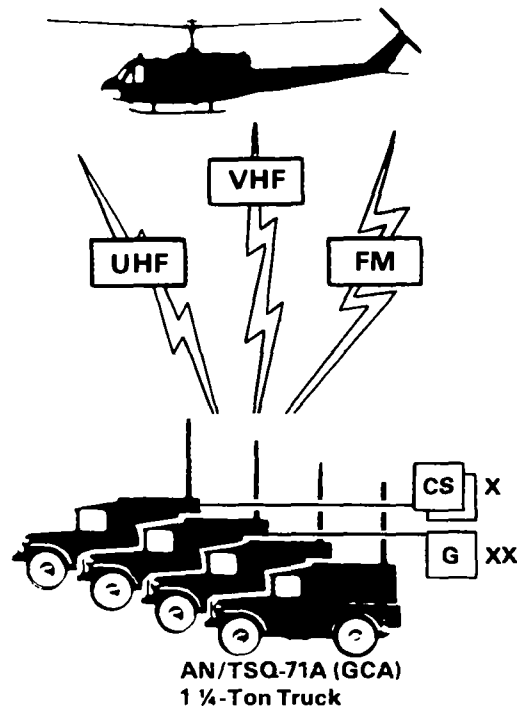
- Organic radio and area signal communications systems are used to transmit and receive weather, notices to airmen (NOTAM), aircraft flight clearances, and operational data.

- This unit performs organizational maintenance on organic equipment and on-site maintenance on noncommon ATC/NAVAIDs equipment.

ATC COMPANY (COMMZ) ATC GROUND/AIR COMMUNICATIONS



X—COMMUNICATIONS SECURITY
XX—GENERATOR



X—COMMUNICATIONS SECURITY
XX—GENERATOR

NOTE: Communications also provided between ground ATC facilities using radios installed in above ATC equipment.

atc battalion (corps)

MISSION

The mission of the ATC battalion is to provide staff administration, operational, and logistical planning and support for Army air traffic control within division and corps rear areas. In addition, the battalion provides command supervision of assigned or attached air traffic control units.

ASSIGNMENT AND EMPLOYMENT

Three ATC battalions are normally assigned to an ATC group. The ATC battalion (corps) may be assigned to an

independent corps or Army task force as required. The battalion normally is employed in direct support of and receives its operational requirements from the corps or task force commander. Two ATC companies (forward) are normally assigned to the battalion to provide the air traffic control and/or assistance needed by supported aviation elements. The battalion headquarters normally is collocated with the corps headquarters it supports. The battalion commander also serves as the corps Army air traffic control officer and is the primary corps staff advisor on the utilization and employment of ATC resources. The battalion staff coordinates with the corps staff and provides appropriate liaison personnel for interface with other airspace users on airspace management requirements and procedures.

■ Provides assigned or attached ATC units with personnel and equipment to support and operate —

CAPABILITIES

- Division instrumented airfields/heliports.
- Corps instrumented airfields/heliports.
- Tactical helipads/landing zones.

■ Enroute air traffic control consisting of up to one flight operations center and five flight coordination centers in the division and corps rear areas.

■ Navigational beacons for use at airfields and/or heliports and enroute air traffic control.

■ ATC liaison personnel to the Air Force control and reporting center (CRC), and airspace management elements of the corps and division.

■ Personnel and equipment to inspect and evaluate ATC facility equipment and maintenance operations.

■ Subordinate units perform on-site direct support maintenance on assigned ATC/NAVAIDs equipment.

atc company (forward)

MISSION

The mission of the ATC company (forward) is to provide terminal and enroute air traffic control, navigational aids, air warnings, and other assistance to inflight aircraft.

ASSIGNMENT AND EMPLOYMENT

Two ATC companies (forward) are normally assigned to each ATC battalion (corps). The ATC company (forward) normally is employed with its platoons placed in direct support of corps and division aviation units operating airfields and/or heliports requiring ATC instrumentation or advisory services. The three ATC platoons operate from dispersed locations within an assigned area and normally are collocated with supported aviation units for security and to enhance responsiveness. Platoon leaders of ATC platoons providing ATC support at the division instrumented airfield also serve as an ATC liaison officer with the airspace management element of the division tactical operations center (DTOC). They also provide assistance for air traffic control planning and coordination of division airspace user requirements and operations.

CAPABILITIES

- Provide terminal ATC services to include tower, approach control, ground control approach radar and terminal navigational aids at up to three Army airfields and/or heliports.

- Provide advisory services and air traffic assistance and navigational aids at up to three noninstrumented helipads.

- Provide three flight coordination centers and navigational aids for employment in the corps enroute air traffic control system.

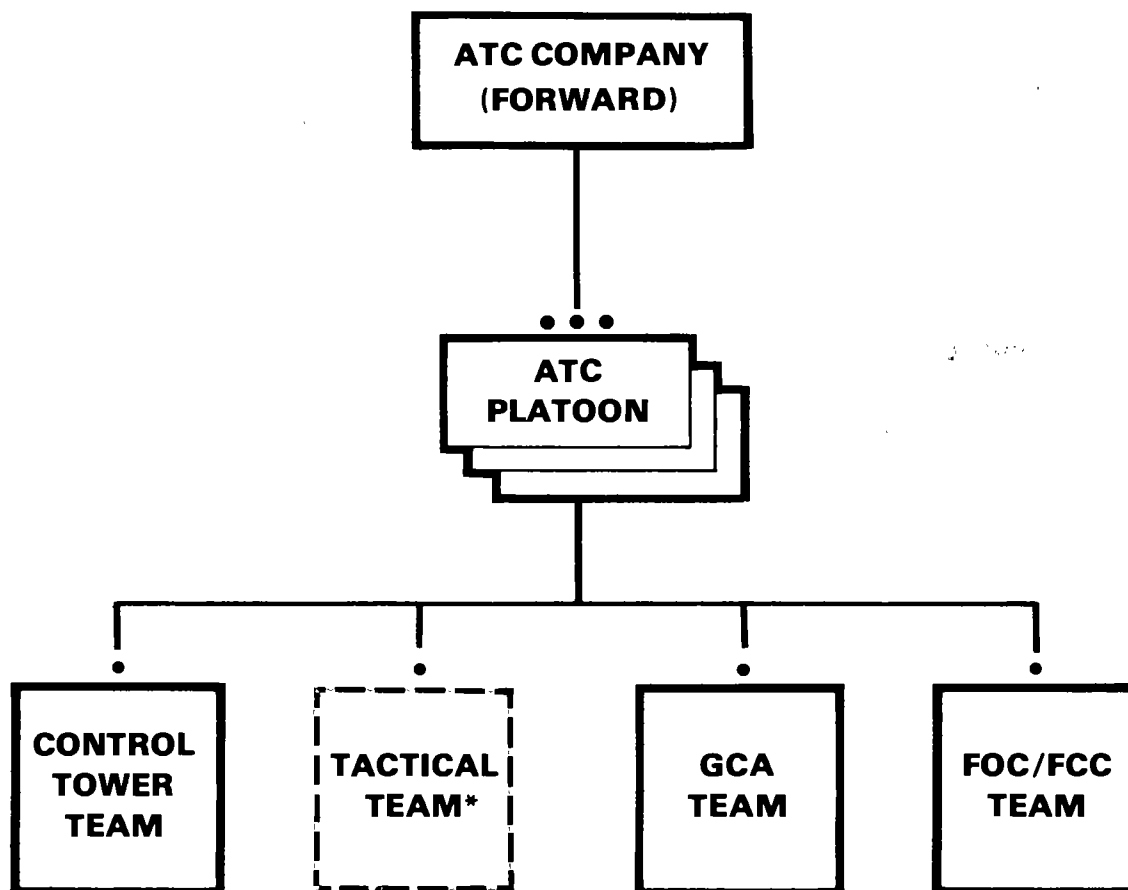
- Provide liaison and coordination with airspace management elements as directed.

- Perform organizational maintenance on organic equipment and on-site direct support maintenance on noncommon ATC/NAVAIDs equipment.

The ATC company (forward) is organized with a company headquarters, supply section and three platoons—each consisting of a platoon headquarters; one tower team; one ground control approach (GCA) radar team; and one enroute flight operations center/flight coordination center team. One of the FOC/FCC teams may be designated as the FOC to provide for the interface and coordination between the Army air traffic control system and the Air Force control and reporting center. One tactical team may be added to the ATC platoon during wartime operations.

ORGANIZATION

AIR TRAFFIC CONTROL COMPANY (FORWARD)



*Under augmentation during wartime operations.



The control tower team provides instrumented terminal air traffic regulation services at airfields and/or heliports supporting division rear or corps aviation operations. The control tower consists of a truck-mounted AN/TSQ-70A and power generators. Personnel requirements are based on a 24-hour-a-day continuous operation consisting of three 8-hour shifts per day in accordance with restrictions outlined in FM 1-200. The ATC tower chief is responsible for emplacement and operation of the tower facility and supervises the overall activities and functions performed by team personnel. Each shift consists of a shift leader and tower operators whose duties include manual approach control, arrival/departure control, and processing flight data information. The avionics communications-electronics (C-E) repairman performs up through organizational maintenance on common avionics radar and up through DS-level maintenance on noncommon equipment installed in AN/TSQ-70A control tower and maintains ATC/NAVAIDs prescribed load list (PLL) parts. The generator operator/mechanic performs organizational-level maintenance on and operates authorized power generators.



The tactical team provides advisory services and air traffic assistance such as medical evacuation, resupply points, or command post locations, at helipads or temporary landing areas. They also provide temporary ATC support during relocation of airfields and/or heliports and their supporting ATC elements. Tactical teams use the AN/TSQ-97 manportable ATC tower and the AN/TRN-30 nondirectional beacon. The tactical team consists of an ATC tower supervisor and three ATC tower operators permitting three 8-hour shifts per day.

NOTE: Composition and capabilities of the ATC platoon tactical teams and the organic division teams are the same.



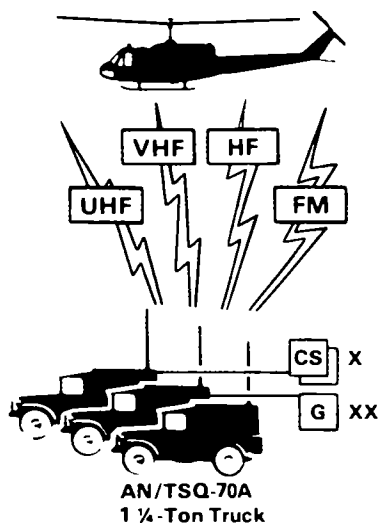
The GCA team provides radar approach control and precision approach radar services for aircraft during periods of adverse weather (instrument meteorological conditions (IMC) or high density aircraft operations). The GCA consists of a truck-mounted AN/TSQ-71A with a radar set AN/TPN-18 (with an IFF AN/TPX-44) and power generators. Personnel requirements are based on a 24-hour-a-day continuous operation consisting of three 8-hour shifts per day in

accordance with guidelines outlined in FM 1-200. The ATC facility chief is responsible for emplacement and operation of various components of the GCA facility and supervises the overall activities and functions performed by team personnel. Each shift consists of GCA shift supervisor and GCA specialist whose duties include radar approach control and precision approach and radar vectoring of inflight aircraft. The avionics C-E repairman performs up through DS-level maintenance and alignment of avionics radio equipment installed in the AN/TSQ-71A GCA control van. The GCA radar repairman performs up through DS-level maintenance and alignment of the radar set AN/TPN-18 and IFF set AN/TPX-44. The generator operator/mechanic performs organizational-level maintenance on and operates authorized power generators.

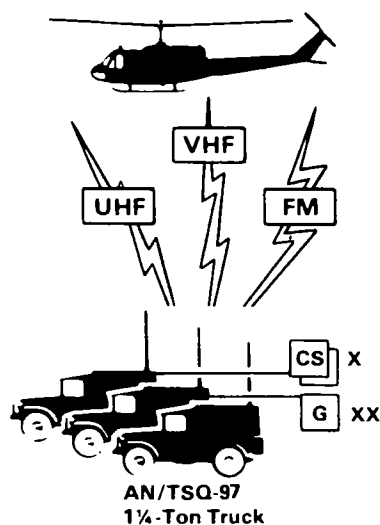
The enroute FOC/FCC team provides enroute air traffic regulation and flight-following assistance to aircraft operating in the Army air traffic control system airspace from the division rear to the corps rear boundaries. The enroute air traffic control consists of one flight operations center and any number of flight coordination centers required to extend the coordination and communications range throughout the corps rear area/division area. The FCCs provide the coordination of enroute regulation and flight-following of aircraft in flight between the FOC and the ATC tower facilities located at Army airfields and/or heliports. The FOC/FCC consists of a truck-mounted AN/TSC-61A and power generators. Personnel requirements are based on a 24-hour-a-day continuous operation consisting of three 8-hour shifts per day in accordance with restrictions outlined in FM 1-200. The ATC facility chief is responsible for emplacement and operation of FOC/FCC enroute facility and supervises the overall activities and functions performed by team personnel. Each shift consists of a shift leader and enroute control operators whose duties include providing and coordinating enroute regulation and flight-following of aircraft operating in the corps rear area. The duties and functions of the avionics C-E repairman are to perform organizational-level maintenance on common avionics radios and DS-level maintenance on noncommon equipment installed in the AN/TSC-61A. The generator operator/mechanic performs organizational-level maintenance on and operates authorized power generators.

**FOC/FCC
TEAM**

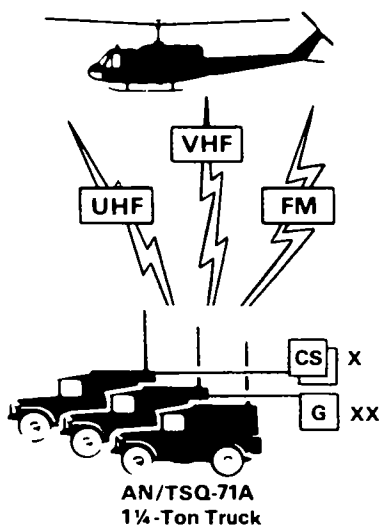
ATC COMPANY (FORWARD) **ATC GROUND/AIR COMMUNICATIONS**



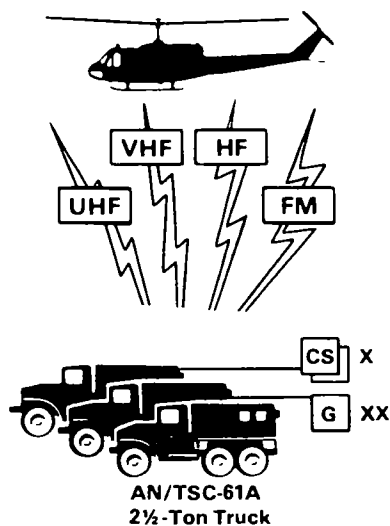
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 XX - GENERATOR



X - COMMUNICATIONS SECURITY
 XX - GENERATOR



X - COMMUNICATIONS SECURITY
 XX - GENERATOR



X - COMMUNICATIONS SECURITY
 XX - GENERATOR

NOTE: Communications also provided between ground ATC facilities using radios installed in above ATC equipment.

appendix c

atc equipment



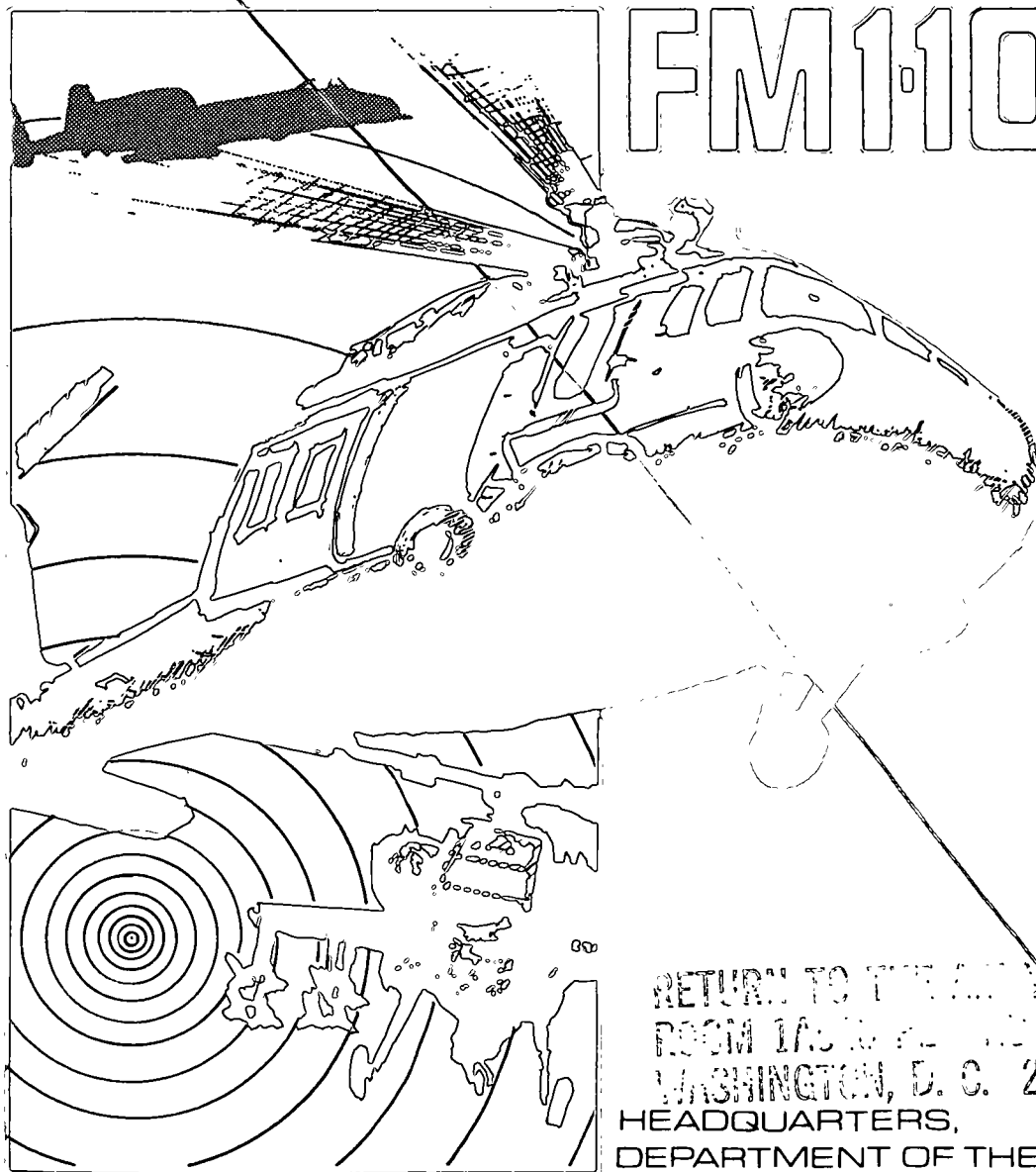
AN/TRN-30(V)

This low-frequency, nondirectional beacon is being produced in both a manpack configuration and a tactical semi-fixed configuration. The AN/TRN-30 (V) may transmit on any of 671 channels spaced 500 hertz (Hz) apart, between 200 and 1750 megahertz (MHz). The average operating range is approximately 27 nautical miles (NM) for the manpack version and 110 NM for the semi-fixed version with the aircraft flying at an altitude of 1,000 feet above ground level (AGL).

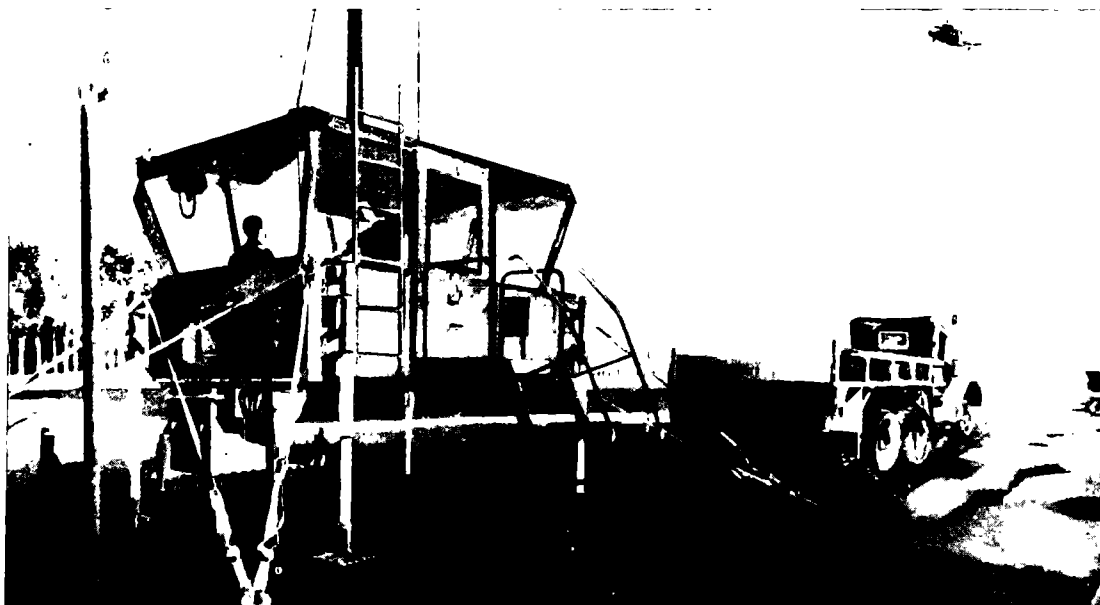
FM 1-103
30 Dec 1981
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K by 100 1. 120, 112. 22 May 1993

AIRSPACE MANAGEMENT AND ARMY AIR TRAFFIC IN A COMBAT ZONE

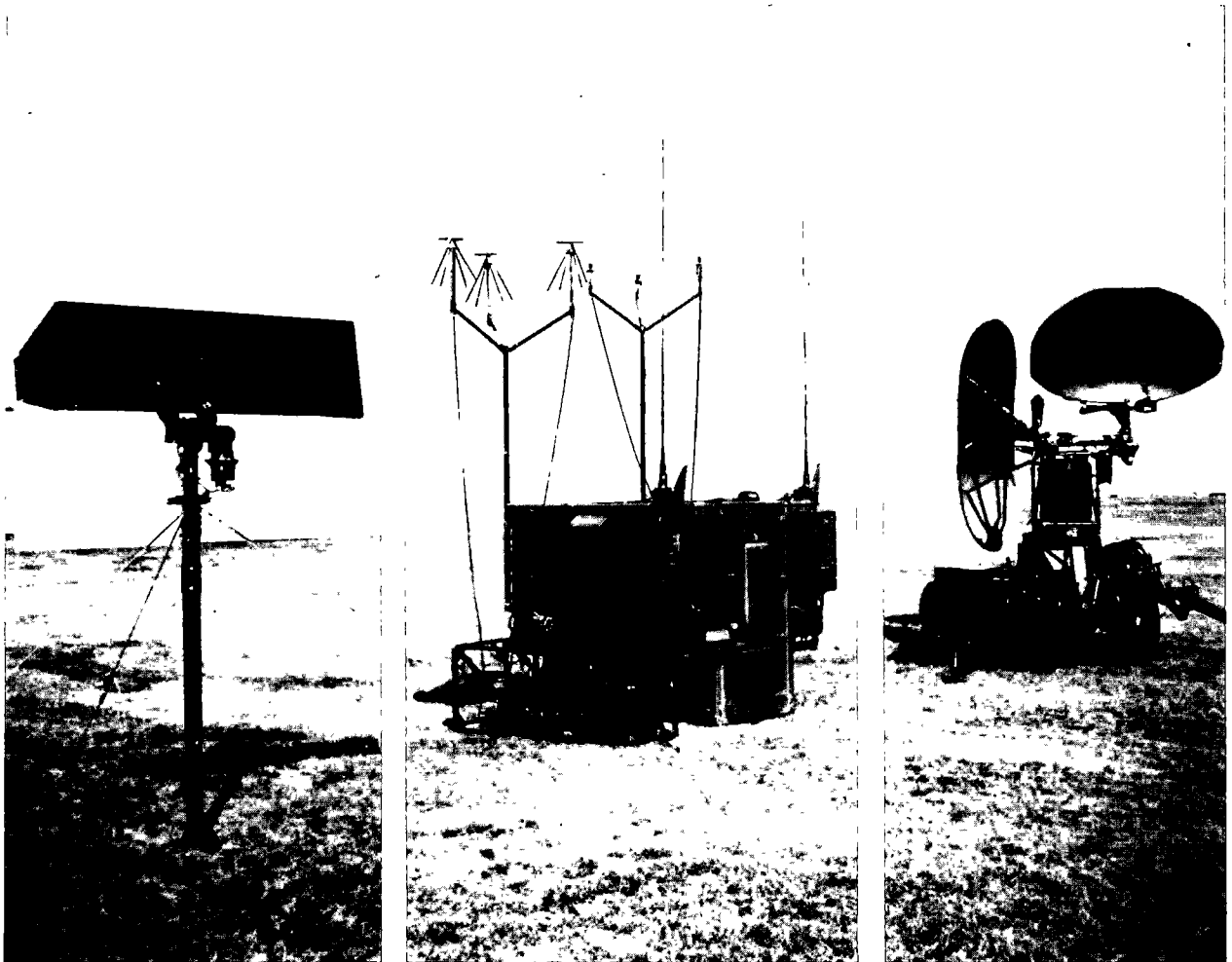
FM1103



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AN/TSQ-70A**AN/TSW-7A**

The air traffic control central, AN/TSW-7A, which is scheduled to replace the AN/TSW-70, is a transportable facility for controlling terminal air traffic at instrumented airfields in the division and corps rear area. The facility consists of five components—a shelter with communications and meteorological equipment for three controller stations, a 3-meter elevating tower, an environmental control unit, and two generator power units.



AN/TSQ-71A

The landing control central, AN/TSQ-71A, is a tactical ground controlled approach facility which consists of an S-318G shelter which houses the AN/TPN-18 precision approach radar, AN/TPX-44 identification, friend or foe (radar)/selective identification feature (IFF/SIF) equipment, and communication radios.



AN/TSQ-97

The AN/TSQ-97 is a manportable air traffic control facility which contains communication and meteorological equipment for tactical landing areas. The equipment can be transported by two men and set up for operation within 10 minutes after emplacement. Its three radios (UHF, VHF, FM) and meteorological instruments can be operated on generator power and on battery power.

appendix d

example of division standing operating procedures for airspace management

(Classification)

3d Mech Div
Fort Carson
1 Feb 197__

STANDING OPERATING PROCEDURES NO 1

AIRSPACE MANAGEMENT

Section I

GENERAL

1. References: Annex A (References).
2. Purpose: To establish procedures for the coordination, integration, and regulation of airspace in the division area of operations (AO).
3. Concept:
 - a. The Commander, 29th Tactical Air Force (TAF), is designated the airspace control authority and the area air defense commander. The provisions incorporated in these standing operating procedures (SOP) are in accordance with the airspace management procedures established in the 29th TAF tactical standing operating procedures (TSOP) and the I Corps TSOP. The division airspace management element (DAME) will continually coordinate with corps airspace management element (CAME) to insure an unimpeded flow of essential information concerning the use of airspace in the division AO. The authority of the division over each airspace user will vary with the situation.
 - b. Both rotary and fixed wing aircraft operate at low and medium altitudes. Army aircraft forward of the division rear boundary normally will operate at low level in visual meteorological conditions (VMC) and in a procedural rather than electronic control environment. Tactical air force supporting the division normally will be in a radar advisory/control environment in radio contact with tactical air control system elements. Coordination procedures must not cause delays in mission employment and must not restrict the movement of support aircraft or the tactical commander's control of organic fire.

(Classification)

(Classification)

(SOP 1—3d Mech Div)

c. These SOPs are designed to identify functional responsibilities in a system based on the principle of management by exception. To accomplish this end, organizations assigned, attached, or under the operational control of this division will insure that their procedures are such that any necessary routine coordination is minimal. In addition, contingent procedures will be established to insure continuity of operations in a degraded airspace control system.

d. The DAME develops and coordinates procedures for the use of airspace by the division. Airspace management priorities and execution details will be identified in the airspace utilization annex to the division plans/orders.

e. The DAME is a manual planning-and-management facility with limited information-handling capabilities; therefore, the principle of resolving potential user conflicts by plans, SOPs, and management by exception, is emphasized. Plans and SOPs will delegate the necessary authority to the lowest possible level of command for taking action to resolve an observed conflict. The provisions of these SOPs will be followed during all command post exercises (CPX)/field training exercises (FTX) to promote familiarity with procedures.

Section II

COMMAND AND STAFF RELATIONSHIPS/RESPONSIBILITIES

1. Command:

a. I Corps. The Commander, I Corps, is responsible for coordinating and establishing an integrated joint airspace control system with the airspace control authority. The CAME serves as the focal point at corps for the coordination of airspace management functions.

b. 3d Mech Div. The Commander, 3d Mech Div, is responsible for conducting airspace management for the division.

c. Brigade/Battalion. Normally there is no requirement for a special staff element at maneuver brigade or battalion dedicated to airspace management. The maneuver commander is responsible for coordinating his airspace activities when those activities may impact on other airspace users.

d. 1st Bn (Hawk, TRIAD), 458th ADA. The Hawk battalion is designated in direct support of the division. The commander, in coordination with the division air defense officer, will consider established division priorities in employment of his unit and accommodate airspace management functions as cited in Annex B (Integration Plan--AADCP with an FCC Element). The following are special requirements for the airspace management function:

(1) Insure that the division air defense officer and the DAME are provided low altitude radar coverage diagrams as soon as possible to facilitate air defense coverage and airspace management integration.

(2) Establish and maintain manual plotting and voice communication facilities as backup for digital data links.

(Classification)

(Classification)

(SOP 1—3d Mech Div)

(3) Coordinate air defense matters with the Chaparral/Vulcan liaison officer to include air defense warnings, weapons control status and rules of engagement changes, and hostile and friendly aircraft data.

(4) When required, provide liaison personnel to operate in the division tactical operations center.

2. Staff: Staff responsibilities and command relationships are as specified in FM 101-5, unless otherwise indicated in these SOPs.

a. ACofS, G3, Operations. The ACofS, G3, will insure that these SOPs are kept current and that they are followed during training exercises at all levels. He exercises staff supervision over airspace management and the DAME and insures that appropriate instructions pertaining to airspace management are published in the airspace utilization annex. He will insure that necessary personnel, required to staff the DAME, are represented in the division tactical operations center and that necessary communications are available for mission accomplishment.

b. ACofS, G4, Logistics. The ACofS, G4, will provide the DAME with supporting airlift information pertaining to airspace management to include--

(1) Preplanned and immediate airlift support requests and the priorities of approved requests.

(2) Location of logistic installations.

(3) Other combat service support information, as required, relating to air-movements.

c. ACofS, G2, Intelligence. The ACofS, G2, will provide the DAME with intelligence information pertaining to airspace management to include--

(1) Enemy air defense capabilities and threat to include radar range/altitude coverages and missile/gun capabilities.

(2) Enemy air threat (number, type, tactics, and capabilities of aircraft).

(3) Location of enemy nuclear, biological, or chemical attacks.

(4) Possible enemy capabilities to counter airspace management aids, such as communications, radars, and beacons.

(5) Possible enemy tactics for employing aircraft in the division area of operations (AO).

(6) Likely enemy aircraft avenues of approach.

d. Air Defense Officer. The division air defense officer is the Commander, 1st Bn (C/V, TRIAD, 441st ADA). To assist in the division airspace management effort, he will--

(1) Provide required ADA personnel and necessary equipment to staff the DAME.

(2) Provide liaison personnel to the 1st Bn (Hawk, TRIAD), 458th ADA, Army Air Defense Command Post (AADCP).

(3) Inform the DAME of AADCP and fire unit locations.

(4) Provide the DAME and the Hawk battalion AADCP with alert information derived from the forward area alerting radar (FAAR) and/or the forward area Chaparral/Vulcan crews.

(5) Advise the division commander on all matters pertaining to division air defense, to include recommending air defense priorities.

(Classification)

(Classification)

(SOP 1—3d Mech Div)

(6) Coordinate with the Hawk battalion to insure integration of the Hawk and short-range air defense (SHORAD) weapons.

e. Aviation Officer. The division aviation officer serves as the principal aviation advisor to the division. To assist the DAME, he will--

(1) Arrange for required aviation personnel and necessary equipment to staff the aviation element of the DAME.

(2) Determine flight plan requirements for division aircraft operating under visual meteorological conditions (VMC) and assure adherence to theater instrument meteorological conditions (IMC) procedures.

(3) Establish procedures with ATC liaison officer (LO) for integrating all Army aircraft entering or leaving division AO.

(4) Recommend positioning of navigational aids and procurement of additional aids organic to division tactical teams.

(5) In conjunction with ATC liaison officer, establish the air traffic regulation system for the division and disseminate this information to all aviation elements operating within the division AO.

(6) Coordinate with the CAME, along with the ATC LO, for integrating additional airspace management elements with division elements.

f. Air Traffic Control Liaison Officer. The ATC liaison officer serves as the principal air traffic control advisor to the division. He will--

(1) Provide ATC support at the division airfield.

(2) Serve as a liaison officer with the airspace management element of the division tactical operations center.

(3) Provide assistance for air traffic control planning and coordination of division airspace user requirements and operations.

(4) Provide a flight coordination center (FCC) element to integrate with the 1st Bn (Hawk, TRIAD), 458th ADA, AADCP.

(5) Provide a tactical team to position navigational aids as recommended by division aviation officer.

(6) Recommend the site of the division main airfield and the requirement for a terminal control zone and positioning of the FCC (-).

(7) Coordinates with the ATC company (forward) commander for integrating the division FCC with flight operations center/control and reporting center/control and reporting post facilities.

(8) Coordinate with division aviation officer on all matters pertaining to air traffic control in the division AO.

g. Fire Support Coordinator. The fire support coordinator for the division is the Commander, 3d Mech Div Arty. He provides the following airspace management information to the DAME through the fire support element.

(1) Significant preplanned indirect fires.

(2) Field artillery battery locations.

h. The electronic warfare intelligence operations center in support of the airspace management effort will--

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(SOP 1—3d Mech Div)

(1) Provide the DAME estimates on enemy jamming capabilities and location of emitters when known.

(2) Provide the DAME time and location of jamming operations by division elements or by higher headquarters that may affect division airspace management facilities or aids.

(3) Inform the DAME of other electronic warfare activities that might impact on airspace management.

(4) Be prepared to react to hostile or friendly electronic warfare activities that degrade the airspace management system.

i. Chemical Officer. The chemical officer will provide the DAME with information concerning--

(1) Friendly and enemy nuclear strikes with effective wind messages.

(2) Radiation fallout plots.

(3) Enemy employment of nuclear, biological, and chemical weapons.

Section III

FUNCTIONS

1. Division Tactical Operations Center: The division tactical operations is the command installation in which necessary personnel and communication facilities are centralized to plan, control, and coordinate tactical operations. Within the division tactical operations center are located the personnel necessary to coordinate airspace management functions. The DAME serves as the focal point for coordinating airspace management activities at the division and with adjacent and higher headquarters.

a. Division Airspace Management. The DAME receives information and requirements necessary for the management of airspace in the division AO through coordination with the CAME, fire support element, tactical air control party, aviation officer, air defense officer, G2/G3 elements, and liaison personnel. This list of personnel and elements should not be construed as limiting the DAME sources of information. The DAME will--

(1) Through the correlation of airspace management information and data received, identify and resolve potential conflicts concerning the use of airspace within the division AO.

(2) Develop and maintain the airspace utilization map.

(3) Develop and maintain recommended minimum risk routes through the division AO and provide to the CAME.

(4) Maintain and disseminate current information of restricted areas, standard-use Army air routes, flight corridors, air defense weapons-free zones, significant preplanned field artillery fires and nuclear strikes, airmobile operations, other major aviation operations, and preplanned close air support strikes and reconnaissance missions.

(5) Relay information concerning air defense warnings, weapons control status and rules of engagement, and identification criteria pertaining to air defense and Army aviation activities within the division AO.

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(SOP 1—3d Mech Div)

(6) Maintain a current picture of the air defense and aviation posture within the division AO and advise the commander and staff on such matters.

(7) Maintain the status of required airspace management aids and disseminate information concerning their location/use as required.

(8) Coordinate with the CAME concerning establishment of, and recommended changes to, coordinating altitudes.

(9) Disseminate information as obtained concerning enemy air and air defense activity.

(10) Coordinate all requirements for flight plans, restricted areas, air defense artillery weapons-free zones, and flight rules and procedures.

(11) Coordinate division requirements for airfield and terminal control zones with the CAME.

(12) Provide airspace management information relevant to development of air-movement plans and insure that airlift requirements for use of airspace are included in airspace utilization annexes to operations plans and orders.

(13) Provide the following information, as a minimum, to the FOC/FCC:

(a) Minimum risk routes, standard-use Army air routes, and flight corridors.

(b) Requirements, if any, for navigational aids and terminal facilities in the division AO.

(c) Restricted areas, air defense artillery weapons-free areas, and air defense weapons control status and rules of engagement.

(d) Coordinating altitude.

(e) Field artillery and air defense artillery fire unit locations.

(f) Requirements, if any, for flight plans and position reports.

(g) Division operation plans and operation orders.

(h) IFF/SIF codes.

(i) Requirements, if any, for broadcasting air warnings, e.g., friendly nuclear strikes, friendly close air support strikes, significant artillery concentrations.

b. Fire Support Element. The fire support element will provide to the DAME:

(1) Location of the fire support coordination line.

(2) Information concerning location of significant preplanned indirect fires (major preparation and final defensive fires) and nuclear strikes.

(3) Location of significant immediate fires.

(4) Location of major fire units (battery and higher) as soon as they are known.

(5) Location of planned nuclear fires.

c. The tactical air control party will inform the DAME of Air Force activity within the division AO and of known Air Force aircraft transiting the division AO at low levels.

d. G2 air informs the DAME of all preplanned low-level reconnaissance flights that will penetrate the airspace over the division AO. Information must include time, route of flight, altitude, number of aircraft involved, and electronic countermeasures to be employed.

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2. Division Flight Coordination Center: The division FCC is responsible for providing enroute, flight-following service upon request for Army aircraft within the division AO and serves as a point of access into the airspace control system. As a minimum, flight-following services will be provided for aircraft crossing an airspace control boundary. The FCC will be positioned to provide maximum coverage to aircraft operating in the division AO. The FCC will--

- a. Relay request and/or clearances for IFR flights and take necessary action to resolve observed conflicts concerning the use of airspace.
- b. Integrate aircraft entering the division AO.
- c. Receive enroute air traffic from, and handover traffic to, adjacent air traffic control facilities.
- d. Provide the Hawk AADCP with an FCC element. Annex B (Integration Plan--AADCP with an FCC Element).
- e. Relay information concerning airspace management as required by the DAME.
- f. Maintain current status of terminal facilities, navigation aids, restricted areas, coordinating altitudes, standard-use Army air routes, and other information pertinent to the air traffic operations.
- g. Notify the FOC of division aircraft proposing penetration of the coordinating altitude.

3. Army Aircraft:

- a. Army aircraft assigned/attached to division and operating within the division AO will not be required to file flight plans during VMC. Employment of Army aviation in the brigade AO may require terrain flying techniques under the control of the brigade commander. Aviation unit operations will provide advance entry information to aircraft entering the brigade area. Aircraft operating within the division AO may request flight-following from the FCC. Pilots will be familiar with the supported unit's tactical situation.
- b. Army aircraft intent on entering or leaving the division AO will file flight plans with the FCC or the FOC as appropriate. These flight plans may be filed through unit operations or by radio with the FCC/FOC.
- c. Army aircraft operating under VMC within the division AO do not require air traffic control enroute clearances.
- d. Army aircraft operating under IMC will receive clearances from the appropriate air traffic control facility (FCC in the division AO, FOC/CRC/CRP in the corps rear operations area).
- e. Army aircraft operating in the division AO must comply with published identification, friend or foe mode/code settings. An IFF transponder checkout can be obtained from the AADCP/FCC element.
- f. Army aircraft penetrating above the coordinating altitude will notify the FCC either by direct communication or through unit operations. Notification will be made as far in advance as possible.

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g. On request, Army aircraft may obtain radar-supported emergency enroute advisory services from the AADCP/FCC element and USAF.

4. Communications: Annex C (Communications).

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MG

OFFICIAL:

/s/Jones

Jones
G3

Annexes: A — References
B — Integration Plan--AADCP with an FCC Element
C — Communications

Distribution: A

ANNEX A (REFERENCES) to SOP NO 1—3d Mech Div

References:

- | | |
|-------------------|-----------------------|
| 1. 29th TAF TSOP. | 14. FM 44-6. |
| 2. I Corps TSOP. | 15. FM 61-24. |
| 3. AR 310-25. | 16. FM 71-100. |
| 4. AR 310-50. | 17. FM 100-26. |
| 5. FM 1-60. | 18. FM 100-28. |
| 6. FM 1-100. | 19. FM 100-32 (Test). |
| 7. FM 6-20. | 20. FM 100-42. |
| 8. FM 11-50. | 21. TC 100-15. |
| 9. FM 11-92. | 22. FM 101-5. |
| 10. FM 24-1. | 23. JCS Pub 1. |
| 11. FM (C) 32-20. | 24. JCS Pub 2. |
| 12. FM 44-1. | 25. JCS Pub 8. |
| 13. FM 44-3. | 26. TOE 37H |

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ANNEX B (INTEGRATION PLAN—AADCP WITH AN FCC ELEMENT) to SOP
No.1—3d Mech Div

1. Purpose: This annex provides the procedures for integrating the 1st Bn, 458th ADA, AADCP, into the airspace management system of the division. It also includes responsibilities, equipment, and personnel requirements.
2. Concept: The FCC supporting the division is essentially a manual facility for flight-following. Although the AN/TSQ-71 is located at the division airfield, it has a primary function of ground controlled approaches for IMC. It has a limited radar surveillance coverage of the division. The direct support Hawk battalion radars with digital data link, real-time input from Air Force and/or associated fire units can provide increased low-altitude radar coverage for the FCC. For example, emergency navigational assistance during unexpected IMC or avoidance headings for unexpected conflicts, such as immediate close air support strikes or enemy air activity, could be provided. The feasibility of the concept will be dependent on the friendly/enemy air situation.
3. Responsibilities:
 - a. The Commander, I Corps, will assign tactical missions to Hawk battalions assigned to the corps when the area air defense commander has delegated corps the authority for employment of Hawk units. The 1st Bn (Hawk, TRIAD), 458th ADA, is designated the Hawk battalion in direct support of the division.
 - b. The Commander, 3d Mech Div, will, in consonance with recommendations from his air defense officer, aviation officer, ATC platoon leader and Hawk battalion commander, insure that a proper site location is made available to the Hawk AADCP/FCC and provide adequate security from ground/airmobile attacks.
 - c. The division operations officer will insure proper coordination between division tactical operations center elements and the AADCP/FCC by arranging required communications in accordance with Annex C (Communications).
 - d. The Commander, 1st Bn (Hawk, SP), 458th ADA, will insure that accommodations are made in the battalion AADCP for the FCC element in the manual AADCP. When possible, one of the air defense operations officers in the AADCP should be aviation qualified. The commander will insure that ADA personnel are properly trained to function with the FCC element and that a liaison team is provided to the division tactical operations center to facilitate planning and operations.
 - e. The Commander, 71st ATC Company (Forward), will provide FCC personnel to the AADCP/FCC from the FCC supporting the division.
4. Operational Procedures: Figure B-1 shows a physical arrangement of the Hawk AADCP with an FCC element integrated. Chaparral/Vulcan liaison is also shown to indicate the close coordination required with Chapparral/Vulcan units in the overall airspace management system of the division. The figure shows the primary AN/TSQ-38 fire distribution van with two radar consoles and the separate backup manual AADCP

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(ANX B (INTGR PLAN—AADCP WITH AN FCC ELM) to SOP 1—3d Mech Div)

with the FCC element. Radio communications will be established to the division FCC on the FCC net (FM), thus facilitating communications with the FCC and Army aircraft.

a. Personnel. The Chaparral/Vulcan liaison officer and FCC personnel are integrated into the manual AADCP. Personnel from the FCC function as recorder/plotter and as flight coordinator. Data received from the Hawk fire units, CRC/CRP, and the collocated acquisition radar are displayed on two display/control consoles of the AN/TSQ-38. The operator on the left display is concerned primarily with the air defense fire distribution and the operator on the right display, with surveillance. The combined mission of the two operators is to monitor/control the air battle. The operator on the right display, when practicable, should be an ADA aviation-qualified officer to facilitate ADA/aircraft coordination. The remaining personnel are an ADA operations officer, an ADA fire control operator, and two ADA plotters--all located in the manual AADCP.

b. Information Flow. The air traffic functions are performed by the FCC personnel based on data displayed on the right console. The data is converted to a grid system common to aircraft and ground operations. Based on common grid data, the FCC element takes action as required. Data from the left display console is passed to the manual AADCP where it is plotted for presentation. Based on this data, air activity reports are provided to the Chaparral/Vulcan AADCP and the DAME. The Chaparral/Vulcan liaison officer will broadcast selected hostile/friendly warnings to division air defense units and others capable of monitoring the tactical air warning net (when established). Priority warnings can be rebroadcast from the Chaparral/Vulcan AADCP over existing nets to fire units/squads. Additionally, weapons control status is passed from the area air defense commander through the CRC/CRP to the DAME and the Hawk and Chaparral/Vulcan AADCP, and is broadcast directly over the tactical air warning net. Change in status will be verified by authentication.

c. Priorities. In performing its functions, the AADCP/FCC will observe the following priorities:

- (1) Air defense mission.
- (2) Emergency information to pilots.
- (3) Emergency directional assistance (vectoring).
- (4) Identification and correlation.
- (5) Transponder checkout.
- (6) Routine directional assistance and flight-following.

d. Equipment (Non-TOE to AADCP).

- (1) One AN/VRC-47 and one AN/VRC-24 with remotes and handsets.
- (2) One acetate covered topographical map (1:250,000) of division area with 5-kilometer grid matrix superimposed.

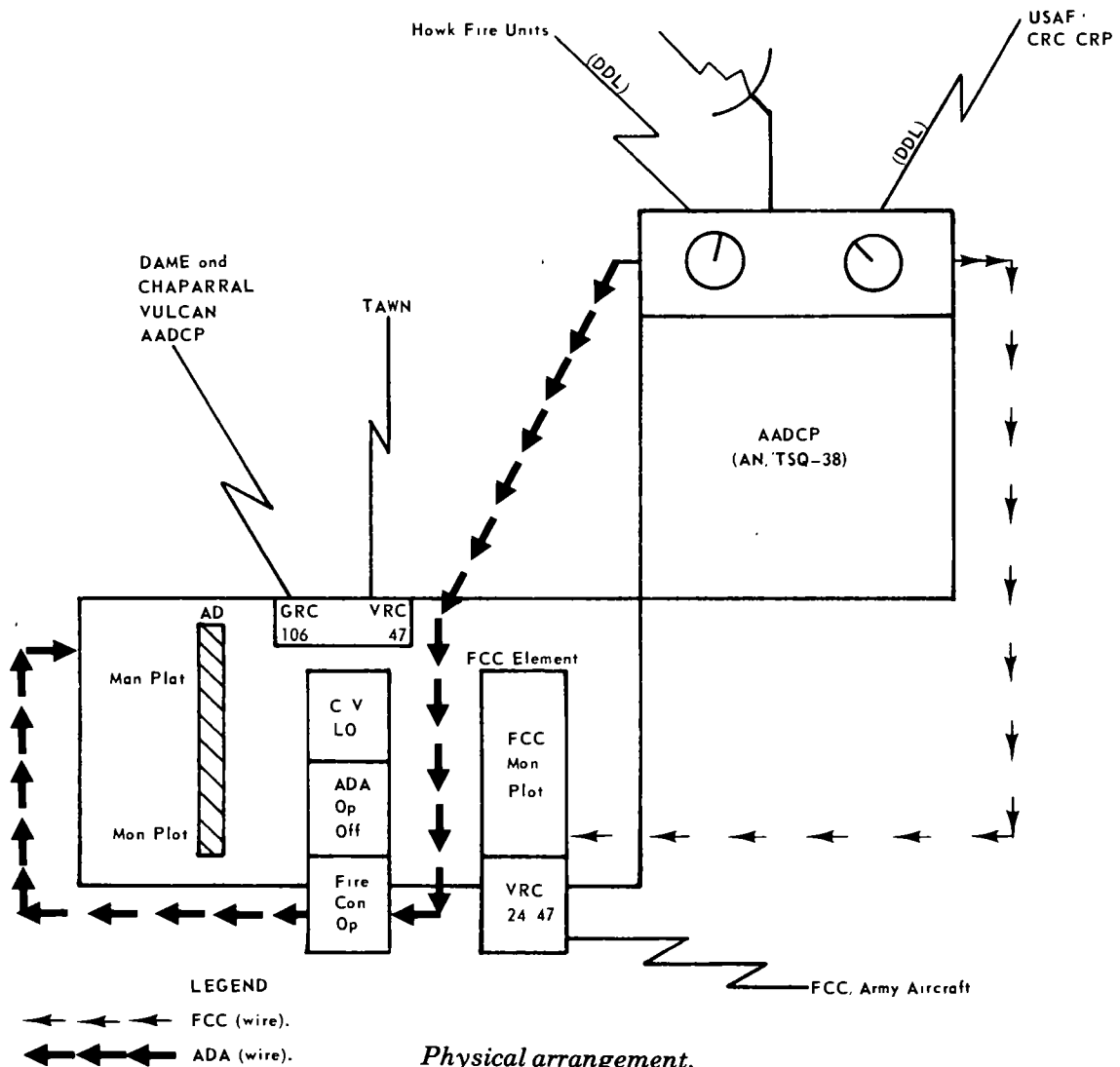
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(ANX B (INTGR PLAN—AADCP WITH AN FCC ELM) to SOP 1—3d Mech Div)

(3) One manually constructed azimuth-determining/range-determining device (degrees and nautical miles).

(4) Two TA-312 phones with headsets.



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ANNEX C (COMMUNICATIONS) to SOP No. 1—3d Mech Div

1. Purpose: This annex identifies the normal communication networks that will support airspace management in the division AO.
2. Applicability: This annex applies to the units and stations (subscribers) that comprise the networks indicated. Unless otherwise indicated, the equipment required is organic to the using unit. Stations in the indicated nets that have no division airspace management function are omitted.
3. Responsibilities: Subordinate unit commanders will insure that the stations/subscribers required for airspace management in the division AO operate in the networks indicated.
4. Radio Nets:
 - a. Frequency Modulated (FM), Tactical.
 - (1) 3d Avn Co command net. This net is used for command and control of organic assets. Normally the division aviation officer at the DAME does not maintain a station in this net. However, when there is no other communication means available, the company may be required to provide radio-equipped liaison personnel at the DAME to insure continuous communications between the FCC (a station in the company command net) and the DAME. See Appendix 1 (Division Airspace Management Radio Nets--Aviation).
 - (2) 3d Mech Div air traffic control net (UHF). This net is used for actual control of Army aircraft operating within the division AO. The principal station and net control station in this net is the FCC. The FCC element at the Hawk AADCP and the airfield terminal control section are the only ground stations normally operating in this net. See Appendix 1 (Division Airspace Management Radio Nets--Aviation).
 - (3) 3d Mech Div aircraft terminal control net (FM, UHF, or VHF). This radio net is used to transmit flight information regarding takeoff/landing for those aircraft using the division instrumented airfield. The airfield terminal control section is the principal ground station and net control station. See Appendix 1 (Division Airspace Management Radio Nets--Aviation).
 - (4) Air defense Chaparral/Vulcan battalion command net. This radio net is used for command and control of the battalion. It links the battalion commander, staff, firing batteries, radar platoon (forward area alerting radar (FAAR)), and the assistant air defense officer located at the DAME. When he has compatible equipment, the Chaparral/Vulcan battalion liaison officer, normally located at the Hawk AADCP, also enters this net. This net is the principal means for disseminating information regarding the control and disposition of battalion fire units. Subordinate elements of the battalion operate similar nets. See Appendix 2 (Division Airspace Management Radio Nets--Air Defense).
 - (5) 3d Mech Div FAAR target alert data display set (TADDS) data links. Each of the eight FAAR sections organic to the ADA Chaparral/Vulcan battalion operates a broadcast-type FM radio frequency data link radio station to transmit digital data that

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(ANX C (COMM) to SOP 1—3d Mech Div)

displays location and tentative identification of aircraft over the division area on firing unit TADDS, including Chaparral/Vulcan and Redeye weapon systems. In the event of failure of the radio frequency data links, these nets have the capability for transmission of one-way voice signals, on a broadcast basis, to voice signal receivers in the TADDS. These nets may also be used in the voice mode to disseminate high-priority air defense advisories/instructions other than digital identification and location data. See Appendix 2 (Division Airspace Management Radio Nets--Air Defense).

b. Amplitude Modulated (AM) and Single-Side Band (SSB).

(1) Corps flight operations net (voice). This net is operated by aviation elements organic to the corps to which the 3d Mech Div is assigned or attached. The net is used for aviation advisory information and coordination when an FOC is established. The 3d Mech Div FCC operates a station in this net. When an FOC is not established at corps, the division FCC enters a similar net established by the supporting Air Force area CRC. See Appendix 1 (Division Airspace Management Radio Nets--Aviation).

(2) ADA Chaparral/Vulcan battalion air defense liaison net (voice). The ADA liaison net is a Chaparral/Vulcan battalion net connecting the battalion AD fire coordination officer at the DS Hawk battalion and the Chaparral/Vulcan battalion's airspace management personnel (at the DAME) with the Chaparral/Vulcan battalion AADCP. See Appendix 2 (Division Airspace Management Radio Nets--Air Defense).

5. Telephone Service, Sole-User: Point-to-point telephone circuits are established between the installations and activities listed below in decreasing order of installation urgency. All circuits indicated are installed and maintained by the 3d Sig Bn, unless otherwise stated.

a. DAME to Chaparral/Vulcan AADCP.

b. DAME to division FCC.

c. DAME to CAME (installed and maintained by corps signal elements).

d. DAME to Hawk AADCP.

e. Chaparral/Vulcan AADCP to Hawk AADCP (installed and maintained by supporting Hawk unit).

f. FCC to Hawk AADCP.

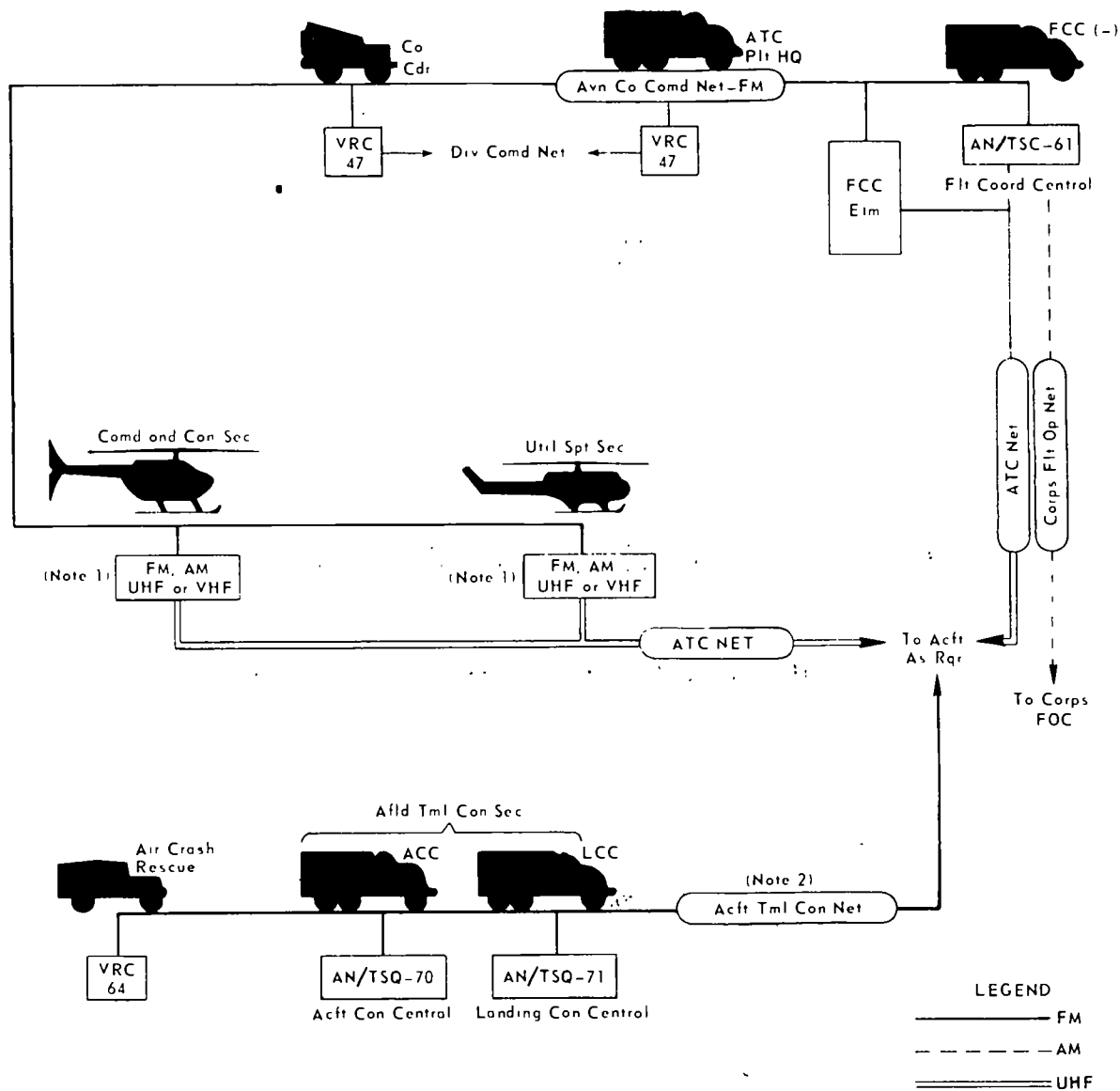
6. Communications Redundancy: The command and common-user telephone and teletype systems and tactical radio nets defined in the 3d Mech Div TSOP are used to supplement the specific communication services provided for airspace management. Use is made of existing communications for disseminating early warning information.

Appendices: 1—Division Airspace Management Radio Nets--Aviation
2—Division Airspace Management Radio Nets--Air Defense

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APPENDIX 1 (DIVISION AIRSPACE MANAGEMENT RADIO NETS—AVIATION) to ANNEX C (COMMUNICATIONS) to SOP No. 1—3d Mech Div



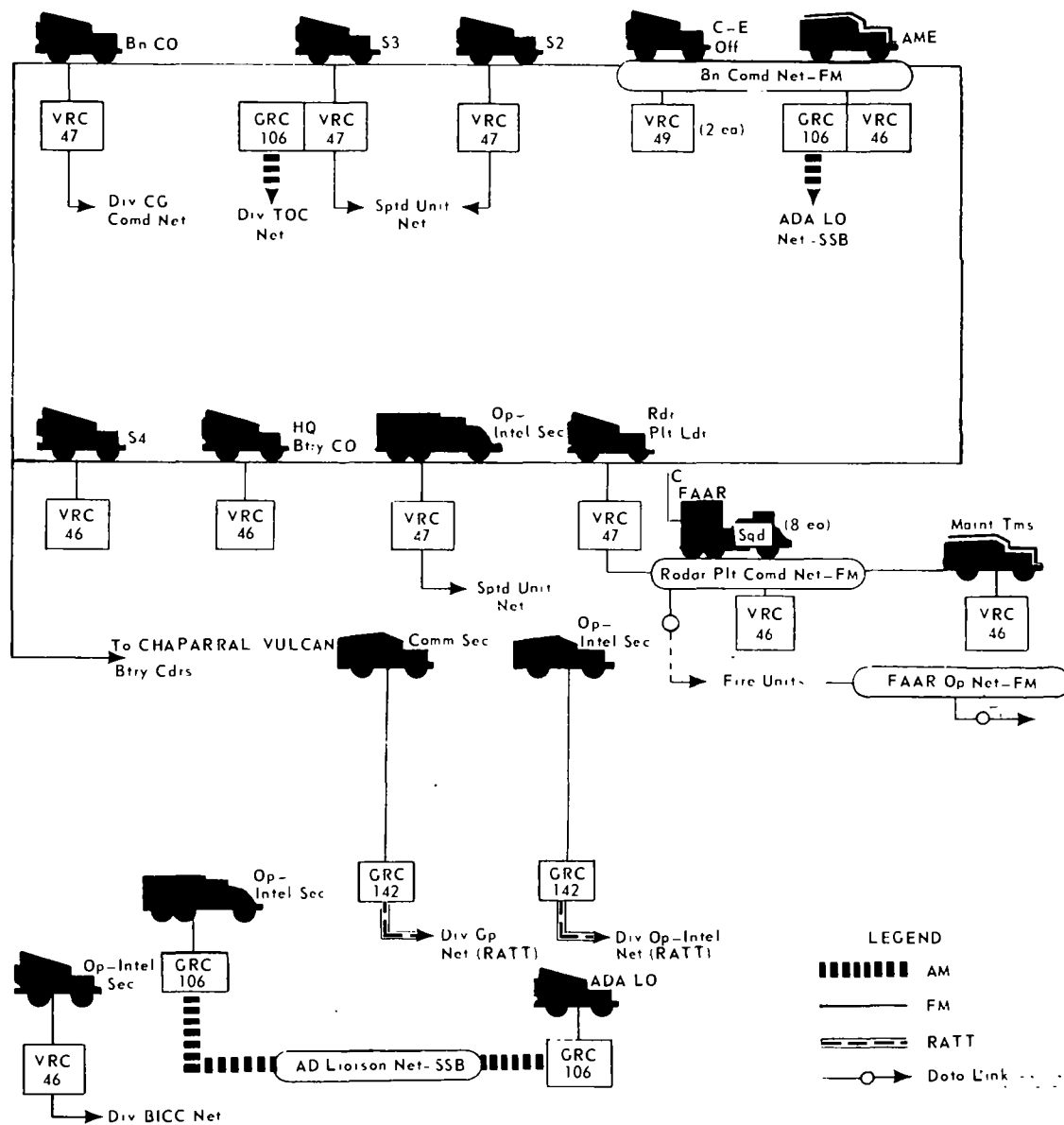
NOTES: 1. Radios part of aircraft. Each aircraft has radio set AN/URC-10 for rescue operations.

2. FM, UHF, or VHF radio; IFF; and ground control approach radar.

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APPENDIX 2 (DIVISION AIRSPACE MANAGEMENT RADIO NETS—AIR DEFENSE) to ANNEX C (COMMUNICATIONS) to SOP No. 1—3d Mech Div



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appendix e

example of unit tactical instrument standing operating procedures for army air traffic

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82d Aslt Hel Company
1st Cbt Avn Battalion
Fort Rucker, Alabama
1 February 197__

STANDING OPERATING PROCEDURES NO 12

TACTICAL INSTRUMENT PROCEDURES FOR ARMY AIR TRAFFIC

Section I

GENERAL

1. References:
 - a. 82d Aslt Hel Co Tactical SOP.
 - b. 1st Cbt Avn Bn Tactical SOP.
 - c. 25th Armd Div Army Air Traffic SOP.
 - d. FM 1-1, Terrain Flying.
 - e. FM 1-5, Instrument Flying and Navigation for Army Aviators.
 - f. FM 1-60, Airspace Management and Army Air Traffic in a Combat Zone.
2. Purpose: To establish procedures for the planning, conduct, and regulation of tactical instrument flight as part of Army air traffic in the forward area.
3. Concept:
 - a. The corps airspace management element (CAME) develops and coordinates procedures for use of corps airspace. The division airspace management element (DAME) develops and coordinates procedures for the use of airspace directly under the control of the division.
 - b. The ATC platoon's flight coordination center (FCC) provides standard and tactical instrument flight clearance and following when required.
 - c. Tac teams organic to the division aviation bn (3) and the ATC platoon (1) are deployed to forward locations to extend the flight coordinating and monitoring capability within the division. These mobile elements can collocate with tactical ground unit aviation sections in order to use their communications nets whenever necessary and possible.

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(SOP 12—82d Aslt Hel Co)

d. Aviation elements operating in forward battle areas will encounter instrument meteorological conditions and be required to conduct tactical instrument flight even though beyond or outside the communication range of ATC elements.

e. Navigational aids belonging to the tac teams will be moved often to avoid enemy electronic detection and destruction, and to provide rapid response to tactical instrument flight requirements. Close coordination is required to insure the mobile beacons are located and operated to best support a tactical instrument flight mission.

Section II

FLIGHT PLANNING

1. Purpose. This SOP is established as a checklist to insure complete and thorough premission tactical instrument flight planning for Army air traffic.

2. Operations.

a. Mission requirements. Analyze the mission to determine all inherent requirements. For example, a single or multiple aircraft or multiple sortie mission will affect the entire planning process. Determine air traffic control requirements necessary to support the mission.

b. Operations/intelligence.

(1) Obtain a current threat briefing from the operations officer. Check the "shot at" file to identify the most current enemy threat.

(2) Familiarize yourself thoroughly with locations, identifications, and postures of friendly units in your AO.

c. Frequencies and call signs. Insure that CEOI information is current and complete and navigational aids can be established and maintained where you need them.

d. Weather information. Check weather information and forecast in the AO. Particular attention should be focused on wind information at point of departure, en route, and at the terminal points. Surface winds should be used. Division artillery can serve as a weather source in the absence of any other more formal sources.

3. Map Study/Analysis.

a. Route selection. Conduct a detailed map study to determine the best possible route that contributes to mission accomplishment. Select primary, alternate, and return routes based on the following factors:

(1) Select the route which affords maximum concealment and masking from the air defense threat.

(2) Locate and plot prominent terrain features and obstacles.

(3) Determine and coordinate NAVAID requirements and flight clearances, with ATC elements, when possible. In the absence of an ATC facility, plan for clearing your own flight and arranging for flight-following with other aviation or ground units along the route. Early coordination and planning insures maximum reaction time for the forward ATC units.

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(SOP 12—82d Aslt Hel Co)

b. Flight altitudes. Determine the minimum safe flight altitude for the selected routes. In the event an air traffic control or clearance facility is not available, you must be prepared to provide and insure your own terrain obstacle clearance. Map analysis is the primary source for determining altitude information.

(1) Altimeter setting. Insure the aircraft altimeter is set to the correct terrain elevation. Current altimeter setting information may not be available other than that obtained from map study and correlation with the aircraft location on the ground.

(2) Enroute and approach minimums. In the absence of standard, published enroute and approach diagrams, map study determines clearance altitudes en route and letdown minimum altitudes at the approach. Use an enroute and minimum descent altitude of *___ feet above the highest obstacle in the flight buffer zone for a safe tactical instrument minimum altitude.

c. Navigation preplanning. Knowledge of the terrain throughout the AO is necessary in order to be able to cope with unexpected changes during the flight.

d. Refuel/rearm requirements. Fuel requirements must be determined and plans made for intermediate refuel stops. Additionally, rearming considerations must be integrated into the plan as appropriate.

e. Magnetic conversion. A significant error can result if you fail to convert grid azimuths to magnetic azimuths.

4. Equipment Requirements.

a. Maps and navigational aids. Conduct a complete inventory to insure all maps or navigational aids are present for the mission.

b. Aircraft equipment. Compute weight and balance, check performance charts, and secure special mission and survival equipment as necessary.

*See page 22-9, FM 1-5, "Instrument Flying and Navigation for Army Aviators," for a discussion of recommended minimum enroute altitude (MEA) and minimum descent altitude (MDA).

Section III

FLIGHT CLEARANCE AND FLIGHT-FOLLOWING

1. Rear Area to Tactical Operations Area. When flying from a rear area to a tactical operations area, the aviator maintains contact with the ATC facility as long as possible and then assumes responsibility for making contact with other tactical forward units for flight-following.

2. Tactical Operations Area to Rear Area. The aviator serves as his own initial clearance authority and attempts to make contact with ATC elements en route. The flight should follow closely the previously planned and coordinated flight plan.

3. Flight Initiated from Unit Heliport or Airfield.

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(SOP 12—82d Aslt Hel Co)

a. Clearance for tactical instrument flights is secured from the division FCC element through the company operations prior to takeoff if communications exist.

b. When radio contact is not possible or feasible, contact the ATC elements by landline prior to takeoff for flight filing and clearance. Landline communication is normally possible through the switch at the next higher supported unit headquarters.

4. Flight Originating from a Tactical Site.

a. In the event tactical instrument flight is required from a forward tactical location, such as a FARRP, and communication cannot be established with an ATC facility, the aviator must serve as his own initial clearance authority.

b. As soon as practical after the flight is initiated, the aviator should attempt to establish radio contact with an ATC element or a ground tactical unit to relay the flight plan. He should follow the original tactical instrument plan as closely as possible until either direct contact with an ATC element is made or a ground unit relay is established.

5. Inflight Transition from Terrain Flying to Tactical Instrument Flight. When the tactical mission requires the transition from VMC to tactical instrument flight, the aviator must carefully analyze his map to select a route and altitude to provide obstacle and terrain avoidance.

a. Communication with an ATC element is not possible. The aviator serves as his own clearance authority until direct communication with an ATC element is made or contact with a ground unit relay is affected.

b. Communication with an ATC element is possible. Report location and intended flight plan. Maintain direct ATC communications as long as possible until flight termination. If enroute communication is lost, follow the reported flight plan as closely as possible until contact is regained (either direct or through a relay) or the flight is terminated. If communications with an ATC element cannot be reestablished, flight-follow with a ground tactical unit.

6. Flight in a Severe Electronic Warfare (EW) Threat or Radio Silence Environment.

a. Of necessity, much of tactical flight will be conducted in a severe EW threat environment. To avoid electronic detection in forward areas, NAVAIDs must be restricted to operation only when they are to be used, and then only intermittently. In order to avoid detection and destruction, the electronic signature of navigational aids and aircraft must be kept to a minimum, thereby making radio silence a requisite for mission accomplishment.

b. Aviators will use landline communications when available for coordinating and clearing tactical instrument flights with an ATC element prior to takeoff. If landline communication is not possible, use secure radio channels. Close initial coordination with the ATC element is essential prior to initiating the flight to eliminate unnecessary radio communications during flight.

c. During a radio silence environment, voice radio communication for navigation and flight-following are not possible. The aviator must coordinate in detail prior to takeoff when possible, serve as his own clearance authority during inflight transitions from VMC to tactical instrument flight, and often operate without a flight-following facility or unit while en route.

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(SOP 12—82d Aslt Hel Co)

Section IV

TYPICAL MISSIONS

1. Corps Area to a Forward Brigade Location.

a. A utility helicopter pilot plans the flight using the SOP checklist. He determines his routes, minimum flight altitudes, and navigational requirements. Flight planning is not limited only to Army-operated air traffic control facilities and navigational aids, but includes all available facilities that can support the flight. Coordination with the corps area FOC/FCC is effected to insure flight-following navigational aids are emplaced and operational in forward areas when needed. The request for IFR clearance is relayed from the unit operations to the basefield terminal control. It is then relayed through the appropriate ATC facility, usually the FOC for Army requests, to the clearance authority which is the airspace management center located at the Air Force CRC. The flight clearance is received and the aviator departs the basefield.

b. En route, the aviator is initially monitored by the CRC and is under positive radar control. As he progresses forward, it is necessary to transition to a lower flight altitude to avoid enemy air defense detection and destruction. The flight is handed over from the CRC to an air traffic controller at the FACP. The FACP, an extension of the CRC, continues to provide him with positive radar control at the lower altitude.

c. As the aviator progresses forward and his altitude is reduced to avoid enemy detection, radar contact at the FACP is lost and the aviator is told to contact the division FCC. The FCC, collocated at the direct support HAWK battalion operations center, has received the information concerning the flight from the FOC. The aviator contacts the FCC and is told that radar contact has been made by one of the HAWK battery's continuous wave acquisition radar scans. The FCC also gives the aviator his present location, as determined by the HAWK radar contact and provides other information concerning weather, air warnings, and status of navigational aids. The FCC also provides radar vectoring using the HAWK radar.

d. Moving farther toward the front, the aviator descends to the minimum enroute altitude (MEA) (previously determined from map study) to remain below the air defense threat. Contact with the FCC is lost and the aviator contacts the forward brigade aviation section. He requests weather conditions in the area and directs that the NAVAID be turned on.

e. After tracking inbound and arriving at the brigade location, the aviator initiates the preplanned approach to the portable nondirectional beacon. During descent to the minimum descent altitude (MDA), he breaks out of the low clouds and visually makes a landing. The aviator requests that the brigade aviation section notify the aviation section at the division main CP that the flight has been completed.

2. Forward Brigade Location to the Corps Rear.

a. An assault helicopter pilot plans a flight from a forward location near the FEBA to the corps rear to a support maintenance facility. By conducting a thorough map

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reconnaissance, the aviator selects the route and determines the minimum enroute altitude. Contact with the FCC cannot be made prior to takeoff but communications with the forward supported brigade confirms the location and operation of a tac team enroute navigational beacon at the brigade aviation section location. The flight route is modified to use this beacon.

b. The aviator requests that the forward supported brigade aviation section relay his intended route of flight, altitudes, and estimated departure time to the division aviation section. The division aviation section receives this information and coordinates it with other known aviation or air defense activities that may conflict with the flight. They also relay the flight information to the division FCC who, in turn, notifies the FOC. The FOC collocated with the CRC coordinates the proposed flight with the airspace management center (AMC). The AMC alerts the appropriate FACP to provide ATC service when radar contact is made. Meanwhile, the division FCC, collocated with the direct support HAWK battalion operations center, coordinates the planned flight with the radar console operator in the AN/TSQ-38 fire distribution van.

c. After executing an instrument takeoff into IMC, the aviator flies at the minimum safe altitudes that insure terrain and obstacle clearance, yet minimizes the possibility of enemy air defense weapons detection. Early attempts to establish contact with an FCC element are not successful, but contact with the brigade aviation section is maintained and information is relayed to the division FCC by the brigade aviation section.

d. As the assault helicopter proceeds farther toward the rear area, the aviator continuously selects a higher altitude to widen the safety margin above the terrain.

e. At or near the brigade rear boundary, contact is established with the division FCC and through HAWK radar contact the aviator is given his location and provided radar vectoring to a nondirectional radio beacon (NDB) located in the division rear. The FCC also provides the aviator his IFR clearance as relayed from the CRC through the FOC. As the flight progresses, the aviator is handed over from the FCC to the FACP. Radar vectoring is provided to his destination. At the termination airfield, a GCA may be initiated if visual conditions are not encountered.

3. Return to Forward Area Refuel/Rearm Point (FARRP).

a. In order to provide timely assault helicopter support in defense of the forward battle areas, assault helicopters must return to the FARRP to refuel. Because of deteriorating visibility conditions, reliance on tactical instrument flight is necessary since the FARRP location is rapidly being enveloped with a low cloud layer. Assault helicopter pilots conduct a thorough map reconnaissance while in the air to determine minimum enroute altitudes and minimum descent altitudes at the FARRP location.

b. Since no flight coordination facility is located in the vicinity, the pilots must clear themselves into IMC to return to the FARRP. Radio contact with the FARRP is made and a portable nondirectional beacon (NDB) is operational there. The aviators fly into the poor visibility conditions using tactical instrument flight. Flight-following and monitoring en route are maintained by both the unit and the FARRP personnel.

c. Upon arriving over the NDB, the assault helicopter initiates a spiraling approach and breaks out within sight of the FARRP.

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d. After refueling, the assault helicopter crews return to the forward battle area by flying outbound from the NDB located at the FARRP. After returning to VMC, the assault helicopters use terrain flying to return to the battle area.

Section V

COMPANY OPERATIONS FUNCTIONS, RESPONSIBILITIES, A COORDINATION

1. Functions. Provide operational flight planning assistance and information to company aviators planning and conducting tactical instrument flight.

a. Determine air traffic control requirements necessary to support the unit mission or a specific flight.

b. Maintain a current operations/intelligence threat briefing for company aviators to be used in flight planning.

c. Insure current ATC element and tactical unit CEOI information is posted.

d. Maintain an up-to-date navigational aids availability status for use in planning tactical instrument flight routes.

e. Maintain a current weather chart.

f. Maintain the current altimeter setting and insure that it is available in tactical unit CPs and FARRPs in the local area.

g. Maintain a reserve of tactical maps of the AO with prominent terrain and obstacles marked for use in planning tactical instrument flights.

2. Responsibilities. Provide the primary and initial point of contact with the division FCC element to coordinate tactical instrument flight plans and clearance.

a. Establish and maintain a communication link with the division ATC elements.

(1) Use existing landline nets where possible to coordinate flight plans and clearances. Normally, landline communication links through the next higher supported unit provide a connection with the division FCC element.

(2) If landline communication is not possible, use secure radio channels to OPCON division ATC elements. Use relays through adjacent units when necessary.

b. Coordinate flight plans and clearances to support the unit mission or a specific flight plan.

(1) Contact and obtain flight clearance from division FCC elements when possible.

(2) Coordinate with adjacent units to relay flight information to division FCC elements when necessary.

3. Coordination. Coordinate placement and use of navigational aids and flight-following.

a. Coordinate with division FCC elements for the placement and relocation (if necessary) of tac team navigational aids or beacons as necessary to support the unit mission or a specific tactical instrument flight.

b. Coordinate with ATC elements and other tactical units, both air and ground, as necessary to provide flight-following and the local altimeter setting for the unit or a specific flight.

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appendix f

glossary of terms

Airspace Control—A service provided within the combat zone to contribute to the maximization of combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to permit flexibility of actions in controlled airspace, while authority to approve, disapprove, or deny combat operations is vested only in the joint force commander.

Airspace Control Area—Airspace which is laterally defined by the boundaries of a joint force area of operations. The airspace control area may be subdivided into airspace control sectors.

Airspace Control Authority—A Service component commander, designated by the joint force commander to plan and coordinate airspace control matters with responsibility for the operation of the airspace control system in the airspace control area. As used in this manual, the airspace control authority is the Air Force Component Commander/Commander, Air Force Forces.

Airspace Control Boundary—The lateral limits of an airspace control area, airspace control sector, airspace restriction or high density airspace control zone.

Airspace Control Center (ACC)—An element within the tactical air control center, which includes component Service liaison, responsible for planning and establishing rules and procedures for the coordinated and integrated use of the airspace by all component forces.

Airspace Control Facility—Any of the several Service component facilities which provide airspace control in the combat zone. As used in this manual, airspace control facilities include the airspace control center, airspace management center, air traffic control facilities, airspace management elements, air defense command posts, and other elements of the tactical air control system.

Airspace Control Sector—A subdivision of the airspace control area, designated by the airspace control authority in consideration of Service component airspace control capabilities and requirements.

Airspace Control Sector Authority—That individual designated by the airspace control authority as coordinating authority for airspace control within an airspace control sector.

Airspace Control System—A system consisting of the organization, personnel, facilities, policies, and procedures required to prevent collisions between aircraft, aircraft and obstructions to flight, and aircraft and surface-launched weapons; and to contribute to the maximizing of combat effectiveness by promoting the safe, efficient, and flexible use of airspace.

Airspace Management—The coordination, integration, and regulation of the use of airspace of defined dimensions.

Airspace Management Center (AMC)—An element within a control and reporting center, which includes component Service liaison, responsible for continuous coordination, regulation, and integration of component Services' air operations, in accordance with the coordinated rules and procedures established by the airspace control center.

Airspace Management Liaison Section (AMLS)—An agency staffed with representatives from all Service components involved, responsible to the airspace control authority for planning, coordinating, and integrating activities related to airspace control.

Airspace Restricted Area—Airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the flight of aircraft is restricted in accordance with certain specified conditions.

Airspace Restrictions—Special restrictive measures applied to segments of airspace of defined dimensions.

Air Traffic Control Facility—Any of the Service component airspace control facilities that may be involved in control of air traffic in an area of operations.

Air Traffic Identification—The use of electronic devices, operational procedures, visual observation, and/or flight plan correlation for the purpose of identifying and locating aircraft flying within the airspace control area.

Coordinating Altitude—An airspace management procedure, for use within airspace of defined dimensions, designed to reduce conflict between fixed-wing and rotary-wing aircraft.

High Density Airspace Control Zone (HIDACZ)—Airspace of defined dimensions, designated by the airspace control authority, in which there is a concentrated employment of numerous and varied weapons.

Instrument Meteorological Conditions (IMC)—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

Minimum Risk Routes (MRR)—Temporary routes of flight, recommended for Air Force use, presenting the minimum known hazards to low-flying aircraft transiting the tactical operations area.

Positive Control—The operation of air traffic in a radar/nonradar control environment in which positive identification, tracking, and direction of aircraft within an airspace is conducted by an agency having the authority and responsibility therein.

Procedural Control—A type of airspace control which is accomplished by nonelectronic means.

Rear Operations Area—That area rearward of the tactical operations area rear boundary where airspace control is more definitive. Dimensions are as directed by the joint force commander.

Tactical Operations Area—That area between the fire support coordination line (FSCL) and the rear operations area where maximum flexibility in the use of airspace is needed to assure mission accomplishment. The rear boundary of the tactical operations area should normally be at or near the rear boundary of the frontline divisions.

Visual Meteorological Conditions (VMC)—Meteorological conditions expressed in terms of visibility, cloud distance, and ceiling, equal to or better than specified minima.

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30 SEPTEMBER 1977

By Order of the Secretary of the Army:

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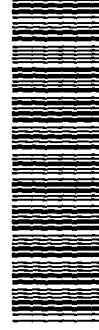
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